IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re the Application of	)		
	)	Art Unit:	To Be Assigned.
Stanley G. Bower *et al.*	)		
	)	Examiner:	To Be Assigned.
Serial No. To Be Assigned	)		
	)	Docket No.:	38-10 (15824)B
Filed: August 10, 2001	)		
	)		
For: Directed Genetic Engineering of *Xanthomonas campestris*	)		

Statement Regarding Sequence Submission

Commissioner for Patents
Washington, DC 20231

Sir:

In accordance with 37 C.F.R. § 1.821(f), the paper copy of the Sequence Listing and the computer readable copy of the Sequence Listing submitted herewith in the above-mentioned application are the same.

Respectfully submitted,

Connie M Caron

Connie M. Caron
Reg. No. 48,131

<110> Bower, Stanley G.
Ramseier, Thomas M.

<120> Directed Genetic Engineering of Xanthomonas campestris

<130> 38-10(15824)B

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<151> 2001-03-28

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<213> Xanthomonas campestris

<220>
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tgatcgcctc caccgcggtg gcgatgctcg cgtacccggt gaccagcagg atgcgcatgt 660

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<400> 15

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35 40 45

Glu Gly Asn Gly Ser Ala Phe Val Met Arg Gly Val Asn His Ala Tyr
50 55 60

Thr Trp Tyr Pro Asp Arg Thr Gly Ser Ile Ala Asp Ile Ala Ala Lys
65 70 75 80

Gly Ala Asn Thr Val Arg Val Val Leu Ser Ser Gly Gly Arg Trp Thr
85 90 95

Lys Thr Ser Ala Ser Glu Val Ser Ala Leu Ile Gly Gln Cys Lys Ala
100 105 110

Asn Lys Val Ile Cys Val Leu Glu Val His Asp Thr Thr Gly Tyr Gly
115 120 125

Lys Asp Gly Ala Thr Ser Leu Asp Gln Ala Gly Asp Tyr Trp Val Gly
130 135 140

Val Lys Ser Ala Ala Trp Arg Ala Gln Glu Asp Tyr Val Val Val Asn
145 150 155 160

Ile Gly Asn Glu Pro Phe Gly Asn Thr Asn Tyr Ala Ala Trp Thr Asp
165 170 175

Ala Thr Lys Ser Ala Ile Gly Lys Leu Arg Gly Ala Gly Leu Gly His
180 185 190

Ala Leu Met Val Asp Ala Pro Asn Trp Gly Gln Asp Trp Ser Gly Thr
195 200 205

Met Arg Ser Asn Ala Ala Ser Val Phe Ala Ser Asp Pro Asp Arg Asn
210 215 220

Thr Val Phe Ser Ile His Met Tyr Gly Val Tyr Asp Thr Ala Ala Glu
225 230 235 240

Val Arg Asp Tyr Leu Asn Ala Phe Val Gly Asn Gly Leu Pro Ile Val
245 250 255

Val Gly Glu Phe Gly Asp Gln His Ser Asp Gly Asn Pro Asp Glu Asp
260 265 270

Ala Ile Met Ala Thr Ala Gln Ser Leu Gly Val Gly Tyr Leu Gly Trp
275 280 285

Ser Trp Ser Gly Asn Gly Gly Gly Val Glu Tyr Leu Asp Met Val Asn
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Gly Ser Asn Gly Ile Ala Ala Thr Ser
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<400> 17

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Leu Pro Lys Val Gly Ala Ala Thr Ser Asn Asp Gly Val Val Lys Ile
35 40 45

Asp Thr Ser Thr Leu Ile Gly Thr Asn His Ala His Cys Trp Tyr Arg
50 55 60

Asp Arg Leu Asp Thr Ala Leu Arg Gly Ile Arg Ser Trp Gly Met Asn
65 70 75 80

Ser Val Arg Val Val Leu Ser Asn Gly Tyr Arg Trp Thr Lys Ile Pro
85 90 95

Ala Ser Glu Val Ala Asn Ile Ile Ser Leu Ser Arg Ser Leu Gly Phe
100 105 110

Lys Ala Ile Ile Leu Glu Val His Asp Thr Thr Gly Tyr Gly Glu Asp
115 120 125

Gly Ala Ala Cys Ser Leu Ala Gln Ala Val Glu Tyr Trp Lys Glu Ile
130 135 140

Lys Ser Val Leu Asp Gly Asn Glu Asp Phe Val Ile Ile Asn Ile Gly
145 150 155 160

Asn Glu Pro Tyr Gly Asn Asn Asn Tyr Gln Asn Trp Val Asn Asp Thr
165 170 175

Lys Asn Ala Ile Lys Ala Leu Arg Asp Ala Gly Phe Lys His Thr Ile
180 185 190

Met Val Asp Ala Pro Asn Trp Gly Gln Asp Trp Ser Asn Thr Met Arg
195 200 205

Asp Asn Ala Gln Ser Ile Met Glu Ala Asp Pro Leu Arg Asn Leu Val
210 215 220

Phe Ser Ile His Met Tyr Gly Val Tyr Asn Thr Ala Ser Lys Val Glu
225 230 235 240

Glu Tyr Ile Lys Ser Phe Val Asp Lys Gly Leu Pro Leu Val Ile Gly
245 250 255

Glu Phe Gly His Gln His Thr Asp Gly Asp Pro Asp Glu Glu Ala Ile
260 265 270

Val Arg Tyr Ala Lys Gln Tyr Lys Ile Gly Leu Phe Ser Trp Ser Trp
275 280 285

Cys Gly Asn Ser Ser Tyr Val Gly Tyr Leu Asp Met Val Asn Asn Trp
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Ile Gly Thr Ser Ser
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cgccggccgc acccacctga caacttactc gctacgtttc ggtagccgct cttcataccg 660

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caggggccgg agggcattgc tgcatgcatc gctgtgcggg atg cgt gcg tcc act 1015
Met Arg Ala Ser Thr
1 5

gat cag gag aca cac ccg atg cac gcc acc tct cgc ccc tgt cca cgc 1063
Asp Gln Glu Thr His Pro Met His Ala Thr Ser Arg Pro Cys Pro Arg
10 15 20

acg ttc tgg caa cgc gct cac cag ttg ctg ttg atc gcg ctg acc ttg 1111
Thr Phe Trp Gln Arg Ala His Gln Leu Leu Leu Ile Ala Leu Thr Leu
25 30 35

ttg ctg acc acc gcc agc gca cag gcc gac gtc atc ctg cat gcg ttc 1159
Leu Leu Thr Thr Ala Ser Ala Gln Ala Asp Val Ile Leu His Ala Phe
40 45 50

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aac tgg ccc tac gcc acg gtg gaa gcg cgc gcc aag cag atc gcc gat    1207
Asn Trp Pro Tyr Ala Thr Val Glu Ala Arg Ala Lys Gln Ile Ala Asp
    55                  60                  65

gcc ggg tat cgc aag gta ctg gtc gca ccg gcg tat cgc tcc gaa ggc    1255
Ala Gly Tyr Arg Lys Val Leu Val Ala Pro Ala Tyr Arg Ser Glu Gly
70                  75                  80                  85

agt gcc tgg tgg gcg cgc tac cag ccg cag gat atc cgc ctg atc gac    1303
Ser Ala Trp Trp Ala Arg Tyr Gln Pro Gln Asp Ile Arg Leu Ile Asp
                90                  95                  100

aat cca ctc ggc gac acc acc gcg ttc gcg cgc atg gtg cag gca ctg    1351
Asn Pro Leu Gly Asp Thr Thr Ala Phe Ala Arg Met Val Gln Ala Leu
            105                 110                 115

gcc aat aac ggc gtg gaa acc tat gcc gac gtg gtg ttc aac cac atg    1399
Ala Asn Asn Gly Val Glu Thr Tyr Ala Asp Val Val Phe Asn His Met
        120                 125                 130

gcc aac gaa gca gca acg cgc tcg gac ctc aat tac ccc ggc agc gcg    1447
Ala Asn Glu Ala Ala Thr Arg Ser Asp Leu Asn Tyr Pro Gly Ser Ala
    135                 140                 145

gtg ctg gcg cag tac gcg gcc aat cct ggg cgc tac gat gca ctg cgc    1495
Val Leu Ala Gln Tyr Ala Ala Asn Pro Gly Arg Tyr Asp Ala Leu Arg
150                 155                 160                 165

ctg ttc ggc acc gtg cag tcc aac ttt ttg agc ggc agt gat ttc ggg    1543
Leu Phe Gly Thr Val Gln Ser Asn Phe Leu Ser Gly Ser Asp Phe Gly
                170                 175                 180

ccg gcg caa tgc atc agc aac tac aac gat gcc ttc cag gtg cgc aat    1591
Pro Ala Gln Cys Ile Ser Asn Tyr Asn Asp Ala Phe Gln Val Arg Asn
            185                 190                 195

tac cgc atc tgc ggc ggc ggc agc gat ccg ggc ctg ccg gat ctg ctc    1639
Tyr Arg Ile Cys Gly Gly Gly Ser Asp Pro Gly Leu Pro Asp Leu Leu
        200                 205                 210

ggc aac gat tgg gtg gtg cag cag cag cgc gcc tac ctg cag gcg ctc    1687
Gly Asn Asp Trp Val Val Gln Gln Gln Arg Ala Tyr Leu Gln Ala Leu
    215                 220                 225

aag ggc ctg ggc gtc acc ggc ttc cgc gtg gac gcg gcc aag cac atg    1735
Lys Gly Leu Gly Val Thr Gly Phe Arg Val Asp Ala Ala Lys His Met
230                 235                 240                 245

acc ttc gac cat ctc aac cgc gtg ttc gat gcc ggc atc cgc tcc ggt    1783
Thr Phe Asp His Leu Asn Arg Val Phe Asp Ala Gly Ile Arg Ser Gly
                250                 255                 260

gtg tac gtg ttt ggt gaa gtg atc acc ggc ggt ggc agc ggc aat ggc    1831
Val Tyr Val Phe Gly Glu Val Ile Thr Gly Gly Gly Ser Gly Asn Gly
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gac tac gac cag ttc ctg gcg ccg tat ctg caa tcc acc ccg cat gcc    1879
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Asp Tyr Asp Gln Phe Leu Ala Pro Tyr Leu Gln Ser Thr Pro His Ala
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gcc tac gat ttc ccg ctg ttc aac gcg gta cgc acg gcc ttc ggt gtg    1927
Ala Tyr Asp Phe Pro Leu Phe Asn Ala Val Arg Thr Ala Phe Gly Val
    295                 300                 305

ggt gcg agc atg caa cag ttg gtg gac ccg gcg tcc gcc ggg cag gcc    1975
Gly Ala Ser Met Gln Gln Leu Val Asp Pro Ala Ser Ala Gly Gln Ala
310                 315                 320                 325

ttg ccg ggc aac cgt gca gtc acc ttt gcc gtg acg cat gac atc ccc    2023
Leu Pro Gly Asn Arg Ala Val Thr Phe Ala Val Thr His Asp Ile Pro
                330                 335                 340

aat aac gcg ggc ttc cgc tac gcg att ctc gac ccg gtc gat gaa acg    2071
Asn Asn Ala Gly Phe Arg Tyr Ala Ile Leu Asp Pro Val Asp Glu Thr
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ctg gcc tat gcg tac ttg ctg ggc cgc aac ggc ggc gtg ccg atg gtc    2119
Leu Ala Tyr Ala Tyr Leu Leu Gly Arg Asn Gly Gly Val Pro Met Val
        360                 365                 370

tac acc gac aac aac gaa agc ggc gac aac cgc tgg gtc aat gcc tat    2167
Tyr Thr Asp Asn Asn Glu Ser Gly Asp Asn Arg Trp Val Asn Ala Tyr
    375                 380                 385

ctg cgc gat gat ctg cgc cgc atg att ggc ttc cac aac ggc gtg cag    2215
Leu Arg Asp Asp Leu Arg Arg Met Ile Gly Phe His Asn Gly Val Gln
390                 395                 400                 405

ggc agc gac atg cag gtg ctg tca tcc agt gcc tgc cac atc ctg ttc    2263
Gly Ser Asp Met Gln Val Leu Ser Ser Ser Ala Cys His Ile Leu Phe
                410                 415                 420

cgc cgc ggc agc ctc ggc atc gtg ggc atc aac aag tgc ggc aac ccg    2311
Arg Arg Gly Ser Leu Gly Ile Val Gly Ile Asn Lys Cys Gly Asn Pro
            425                 430                 435

gtc aac acc acc gtc gcc atg aac ggc agc gtg ttg ttc tgg aat gcg    2359
Val Asn Thr Thr Val Ala Met Asn Gly Ser Val Leu Phe Trp Asn Ala
        440                 445                 450

gat tac gtc gat gca ctg ggt tcc ggc acc gtg gtg cgc atc tcc agt    2407
Asp Tyr Val Asp Ala Leu Gly Ser Gly Thr Val Val Arg Ile Ser Ser
    455                 460                 465

ggc tcg tac acc ttc acc ctg ccg gcg cgg cag gcg cgt atg tgg cga    2455
Gly Ser Tyr Thr Phe Thr Leu Pro Ala Arg Gln Ala Arg Met Trp Arg
470                 475                 480                 485

cgt tga ttttgcagac gcgctgcagc acggtctgtt ttccgtaggt gacatccagg     2511
Arg

caaccaggga acaccagcag atcccgctga gtagcaacac cgacgccttc atgggtgcag  2571

cccgcatgaa ggcgtcgatg cgttaggcaa ccgaaaaaat ctacaacgac gcatcttttt  2631
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Pro Lys Arg Pro Gly Arg Ala Met Met Arg Ser Val Leu Met Ala Ala
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Met Leu Leu Tyr Ser Gly Ala Ala Cys Ala Ala Pro Ala Pro Gly Asp
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Tyr Tyr Gly Thr Leu Glu Pro Phe Ala Ala Asp Ala Val Tyr Phe Val
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Val Thr Asp Arg Phe Val Asn Gly Asp Thr Gly Asn Asp His Arg Asp
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Gln Gly Gly Ala His Arg Ser Phe Asp Val Pro Thr Pro Cys Asp Gly
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Gly Val Gly Asp Asn Ile Gly Tyr Leu Gly Gly Asp Phe Lys Gly Ile
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Val Asp His Ala Asp Tyr Ile Arg Gly Leu Gly Phe Gly Ala Val Trp
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Ile Thr Pro Ile Val Asp Asn Pro Asp Glu Ala Phe Thr Gly Gly Lys
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ccc atc acc tgc gag agc acg ctc agc gat cac ggc aag acc ggt tat    1447
Pro Ile Thr Cys Glu Ser Thr Leu Ser Asp His Gly Lys Thr Gly Tyr
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Ser Pro Gly Leu Asp Phe Ala Gly Phe Thr Arg Ala Met His Ala Asn
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gac ctg aag gtg gtg ctg gat atc gtc ggc aac cac ggc tcg ccc gcc    1591
Asp Leu Lys Val Val Leu Asp Ile Val Gly Asn His Gly Ser Pro Ala
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Tyr Ser Met Pro Val Ala Gln Pro Gly Phe Gly Lys Leu Tyr Asp Ala
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Gln Gly Arg Leu Val Ala Asp His Gln Asn Leu Ala Pro Ala Gln Leu
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gac ccg gcg cac aac ccg ttg cac gcg ttc tac aac acc agc ggc ggc    1735
Asp Pro Ala His Asn Pro Leu His Ala Phe Tyr Asn Thr Ser Gly Gly
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Tyr Leu Ala Gly Ala Tyr Leu Gln Trp Met Glu Gln Gly Ala Asp Ala
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Phe Arg Ile Asp Thr Ile Gly Trp Met Pro Asp Arg Phe Trp His Ala
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Phe Val Ala Arg Ile Arg Glu Lys Arg Pro Gly Val Phe Met Phe Gly
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gaa gcc ttc gac tac gac ccg gcc aag atc gcc ggc cac acc tgg gcg    1975
Glu Ala Phe Asp Tyr Asp Pro Ala Lys Ile Ala Gly His Thr Trp Ala
310                 315                 320                 325

cgc aac gcc ggc gtc agc gtg ctg gac ttc ccg ctc aaa cag cag cta    2023
Arg Asn Ala Gly Val Ser Val Leu Asp Phe Pro Leu Lys Gln Gln Leu
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tcc gcc gtg ttc ggc cac aaa cag gct ggc ttc gaa cag ctc gcc acg    2071
Ser Ala Val Phe Gly His Lys Gln Ala Gly Phe Glu Gln Leu Ala Thr
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ccg ctg tat ctg cgc aaa ggc ccg tat ggc aac ccg tac gag ttg atg    2119
Pro Leu Tyr Leu Arg Lys Gly Pro Tyr Gly Asn Pro Tyr Glu Leu Met
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Ser Phe Tyr Asp Asn His Asp Met Ala Arg Leu Asp Ala Ser Asp Thr
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Val Ile Tyr Tyr Gly Ser Glu Thr Gly Phe Met Arg Gly Arg Ala Glu
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cac gcg ggt aat cgc aat tat ttt ggc gaa gag cgc gtc agc aac gca    2311
His Ala Gly Asn Arg Asn Tyr Phe Gly Glu Glu Arg Val Ser Asn Ala
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ccg cag agc ccg atc ttc ggc ccg ctg cag cgc atc gcg acc ttg cgg    2359
Pro Gln Ser Pro Ile Phe Gly Pro Leu Gln Arg Ile Ala Thr Leu Arg
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Arg Asn Thr Pro Ala Leu Gln Arg Gly Val Gln Val Asp Leu Gln Leu
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Arg Gly Asn Gln Ala Ala Phe Leu Arg Val Tyr Gln His Ala Gly Met
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Ile Ala Val Ser Arg Leu Leu Gln Pro Gly Ser Trp Arg Asp Ala Phe
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Ser Gly Glu Gln Val Gln Val Gln Gly Arg Val Thr Leu Gln Val Pro
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Ala His Gly Val Arg Val Leu Leu Ser Asp Ala Pro Val Thr Asp Val
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Ala Leu Arg Lys Gln Leu Asp Ala Gln Met Ala Asp Gln Ala Ala Arg
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gat gca cgc aac aag tag gagcgcgcca gcgcgcgatg cggcgttatc           2743
Asp Ala Arg Asn Lys
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Gly Val Asp Arg Arg Leu Cys Gly Arg Gly Pro Val Gly Gly Gly Asp
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Ala Ile Gly Leu Val His Gln Pro Glu Asp His Leu Leu Val Val Phe
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Glu Leu Gln Arg Gln Ala Ala Pro Gln Ile Gly Gln Cys Cys Arg Arg
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Gln Val Gln Asp Gln Glu Leu Leu Val Gly Leu Gly Gly Gly His Gly
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Phe Phe Asp Gln Arg Gln Leu Arg Arg Ile Gln Leu Ala Ile Glu Gly
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Trp Leu Gln Ala Leu Pro Gln Glu Arg Gln Ala Asn Gly Val His Ala
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Asp Val Asp Ala His Val Leu Gln Ser Ala
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Gly Gly Gly Gly Phe Val Thr Gly Val Leu Phe His Pro Ala Glu Arg
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Gly Leu Ala Tyr Ala Arg Thr Asp Val Gly Gly Ala Tyr Arg Trp Asp
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Ala Asp Ala Leu Tyr Leu Ala Ala Gly Thr Tyr Met His Glu Arg Ala
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cgt gcc gac ctg ccg ttt aag ctg ggt ggt aac cag ctg ggc cgc gcc    1591
Arg Ala Asp Leu Pro Phe Lys Leu Gly Gly Asn Gln Leu Gly Arg Ala
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Leu Gly Ser Arg Asp Ala Gly Leu Trp Arg Ser Asp Asp Arg Gly Ala
    215                 220                 225

cac tgg gcg aag gtg gcg tcg ttt ccg gac gcc gcg ctg gcc ggt gcc    1735
His Trp Ala Lys Val Ala Ser Phe Pro Asp Ala Ala Leu Ala Gly Ala
230                 235                 240                 245

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310                 315                 320                 325

tat ggc gac cag ccc ggg ccg gac ctg atg gcc ggg gga gcc ttg tgg    2023
Tyr Gly Asp Gln Pro Gly Pro Asp Leu Met Ala Gly Gly Ala Leu Trp
                330                 335                 340

aaa ttc acg ccg gca cag ggg cgc tgg cgt gag atc agc ccg att ccg    2071
Lys Phe Thr Pro Ala Gln Gly Arg Trp Arg Glu Ile Ser Pro Ile Pro
            345                 350                 355

cag cca gcc agt ggc gat gga ttc ggc tgg ggt gcg gtg gcg gtg gat    2119
Gln Pro Ala Ser Gly Asp Gly Phe Gly Trp Gly Ala Val Ala Val Asp
        360                 365                 370

ccg caa cat ccg cag gtg ctg ctg gcc agc acc ttc cgc cgt cgc acg    2167
Pro Gln His Pro Gln Val Leu Leu Ala Ser Thr Phe Arg Arg Arg Thr
    375                 380                 385

ccg cgc gac gag ctg tat cgc agc gtg gat ggt ggc aag cac tgg acg    2215
Pro Arg Asp Glu Leu Tyr Arg Ser Val Asp Gly Gly Lys His Trp Thr
390                 395                 400                 405

ccg ttg ttg gcc gat gcg gtg ttc gat cac agc gcc gcg ccg tgg acc    2263
Pro Leu Leu Ala Asp Ala Val Phe Asp His Ser Ala Ala Pro Trp Thr
                410                 415                 420

gca cat gcc acg ccg cac tgg atg ggg gcg ctg gcg atc gat ccg ttc    2311
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Ala His Ala Thr Pro His Trp Met Gly Ala Leu Ala Ile Asp Pro Phe
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gac ggc aac cat gcg ctg ttc gtg acc ggc tac ggc atc tgg gcc tcg    2359
Asp Gly Asn His Ala Leu Phe Val Thr Gly Tyr Gly Ile Trp Ala Ser
        440                 445                 450

cgc aat ctg cag gat ttc gcc gca ccg cag cgc ccg ctg cag tgg tgg    2407
Arg Asn Leu Gln Asp Phe Ala Ala Pro Gln Arg Pro Leu Gln Trp Trp
    455                 460                 465

ttc cag gac cgt ggg ctg gaa gaa acc gtg ccg ctg gac ctg ctc agc    2455
Phe Gln Asp Arg Gly Leu Glu Glu Thr Val Pro Leu Asp Leu Leu Ser
470                 475                 480                 485

ccg atg gct ggc gcg cat ctg ctc agc gcg ctc ggc gat atc gac ggc    2503
Pro Met Ala Gly Ala His Leu Leu Ser Ala Leu Gly Asp Ile Asp Gly
                490                 495                 500

ttc cgg cat gac gac ctg gac cgc gtg cag ttg cag tac gcc ggc cca    2551
Phe Arg His Asp Asp Leu Asp Arg Val Gln Leu Gln Tyr Ala Gly Pro
            505                 510                 515

cgg ctg acc aat ggc gaa agc atc gat gcc gcc ggc cag gcg ccg cag    2599
Arg Leu Thr Asn Gly Glu Ser Ile Asp Ala Ala Gly Gln Ala Pro Gln
        520                 525                 530

tgg gtg gtg cgc agc ggt acc gtg cgc gcc cgc cgc aac aac gaa atc    2647
Trp Val Val Arg Ser Gly Thr Val Arg Ala Arg Arg Asn Asn Glu Ile
    535                 540                 545

cgc gcg ctg tat tac gcg tga tggcggcaag caatggactg cgtttgcgag      2698
Arg Ala Leu Tyr Tyr Ala
550                 555

tgagccgcca gccgggcagg gcgccggcag cattgccatt ggtgccgatg cggcgcaggt  2758

ggtgtgggca ccggcgcgcg gcggcaattg gcgcacgtcc gacttcggcg cgcagtggca  2818

gcgtgtgaac gccctgccga accccgcgtg ggtggtgacc gatcgggtgg acgcacggcg  2878

ctggtatgcg gtggatgtcg ccagcgggca gctgtacgag agcaccgatg ccgcgcgcag  2938

tttccgtgcg accggtgtac aggtgggcag cccggcgcgc gatgagcgca cccggccgca  2998

gctgcgtccg gacccgtggc gcgcaggcgt ggtgtatctg gccagccccg gcaagggtgt  3058

gatgcgctgg caggacggtg cgctgcaggt gctctcacag ccggacgaag cacgctcgct  3118

gggcatcggc aaggcgctgc gggccggtgc gccgccggcg ctgtatctgg ccgggcgcgt  3178

gcagggcgtg gatggcgtgt tccgctccga cgatggcggc gcgcagtggc agcgcatcaa  3238

cgatgacgcg caccgcttcg ggcgcccgta cagcgtgacc ggtgatccgc gcattgccgg  3298

gcgtgtgtac ttcgccaccg gcggccgcgg cattttctac ggcgatccga gatgagcagt  3358
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gcatgcctgt ccgcgacgtc ctgctgcttt accgtgtacg gcgccgccgg cctggccgct 3418

gcgggcgccg tgacaccgcc gaccctggag atcaccgcat gaccccgtcc cacatttccc 3478

gcgcctgctt gctgggtgtg ttgctggcca gcggcagcgc cgccgcgcaa ccgagcctgc 3538

cgttgctgtt tgccgatggc gcggtgctgc agcgcgatga ggcaatgccg gtatggggct 3598

gggccacgcc cggcgccgca atcacggtga gtttcgatgg caagcaggcc accgccaaga 3658

ccgatgcgca 3668

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gggaccgggc gaatccgacg gcgccagcaa gtccatcgcc aacaaccagg gcaagggctt 120

cgacagatac tgcgacccga cctatacgac gccggacggc acgttgacgg gtgccttgcc 180

gaacgcgccg atcgccggta actggttcca cgcgcagttc ctccagttgg tcgccaacgc 240

gtatcccgcc atcggcacct cgaccaaggc ggcgctgcag tcggcgtcga ccgacgcggt 300

gcccgccagt cggccgacgg cgaccaaggg gttgaccgcc aatgcagcgg atggcgaggt 360

caggctcagc tggtcgcccg ttgccggtgc cacgggttac acggtgcaac gtgtcgccga 420

cgcaaccgct gctcccatca ccgtcgcatc gggcctgacc tcgccctcat atgtggacca 480

gacgctcacc aacggcacca cgtactacta caaggtaacg gccaacggcg catcgggtgc 540

agacgcgagc tcggtcaccg tgagcgcgac accgcatcgg tgatacgata actgcgttgc 600

cacagagcgg tagaggctag tgtgctctac cgctcctcgg ccgcgggagg agcgctgcaa 660

ccacgatggc ggcgccttgc gcccgccatt tcaatcgctg tcgtgctgct ctacctctgt 720

ctggagcgcg gcatgcgctt cgaatgagat gacatcggag cagatgccgt cgctggcgga 780

acgggcgctg catggcacag gctcggtagc gccacggcaa gcggcgcagc gtccactccg 840

tgccgctgac ggccaacccg gcctgtggca tgccgggact gcatcgcgcg cgttgccggg 900

gagctgcgcc cttttgtctc cacccgcaca ggccgcttcg cacgcaaccg tacataacac 960

actccagaag acgtccatgc catcacatat ccatttcttg atc gcg ctc gca acg 1015

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                                                    Ile Ala Leu Ala Thr
                                                    1               5

ctc atc ccg gtc acc gcg ccg gcg atg cag gtc agt acg caa gct ccc    1063
Leu Ile Pro Val Thr Ala Pro Ala Met Gln Val Ser Thr Gln Ala Pro
                10                  15                  20

ctt gtc gat gca aca ggt cag acg ctg cac att cgc ggg gtc acc tgg    1111
Leu Val Asp Ala Thr Gly Gln Thr Leu His Ile Arg Gly Val Thr Trp
            25                  30                  35

ccc ggc ttc gat cgc gcc ggg ttg gcg gcc gtc ggc atg cgc aac aac    1159
Pro Gly Phe Asp Arg Ala Gly Leu Ala Ala Val Gly Met Arg Asn Asn
        40                  45                  50

aca ctg gcg caa ctg ctg gat cgg atg cag gcg tca gac atc aat gcc    1207
Thr Leu Ala Gln Leu Leu Asp Arg Met Gln Ala Ser Asp Ile Asn Ala
    55                  60                  65

gta cgt gtg ccg gtc tgc gcc gct gtt ctg caa cgc gcc cct gtg gca    1255
Val Arg Val Pro Val Cys Ala Ala Val Leu Gln Arg Ala Pro Val Ala
70                  75                  80                  85

gct gca gaa gtt gcc ggc gat tcc acg ctg cgc gga tta gat tcc ttg    1303
Ala Ala Glu Val Ala Gly Asp Ser Thr Leu Arg Gly Leu Asp Ser Leu
                90                  95                  100

caa ctg ctc gac gca gtg gtg cat gcc gca agc cag cgc ggg atg cag    1351
Gln Leu Leu Asp Ala Val Val His Ala Ala Ser Gln Arg Gly Met Gln
            105                 110                 115

gtg atg ttc gcg ttt gca gat gga ggc tgc gat gac cgc gca ccg ctc    1399
Val Met Phe Ala Phe Ala Asp Gly Gly Cys Asp Asp Arg Ala Pro Leu
        120                 125                 130

ctg ggc gca cag cag caa gca tgg acg cgc ggc ctg gtt acg ctg gca    1447
Leu Gly Ala Gln Gln Gln Ala Trp Thr Arg Gly Leu Val Thr Leu Ala
    135                 140                 145

cgc cgc tat ggc ggc aac gcc aat gtc ctg ggc att gac ctt ggc agc    1495
Arg Arg Tyr Gly Gly Asn Ala Asn Val Leu Gly Ile Asp Leu Gly Ser
150                 155                 160                 165

agc ggc tat cgc aat gcc agc tgg gca gga aac gcg gcg gat cag gat    1543
Ser Gly Tyr Arg Asn Ala Ser Trp Ala Gly Asn Ala Ala Asp Gln Asp
                170                 175                 180

tgg aac cgg gta gcg tcg cgc gca gtt gca agg gtg ctg gcg cag gca    1591
Trp Asn Arg Val Ala Ser Arg Ala Val Ala Arg Val Leu Ala Gln Ala
            185                 190                 195

ccg cgc tgg gtc gtc ggt gtg gaa ggt gtg ggc agc aat gcg gtg tgc    1639
Pro Arg Trp Val Val Gly Val Glu Gly Val Gly Ser Asn Ala Val Cys
        200                 205                 210

agt gac cca gag cgc aag gcg cct ggc agc aat ctt cag ccg ttc gcg    1687
Ser Asp Pro Glu Arg Lys Ala Pro Gly Ser Asn Leu Gln Pro Phe Ala
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    215                 220                 225

tgc gtg ccg ctg gac atc gct cgc cga cac ttg gtg ttg atg ccg aag    1735
Cys Val Pro Leu Asp Ile Ala Arg Arg His Leu Val Leu Met Pro Lys
230                 235                 240                 245

ttg gcg ggc ccg gat cgc gat acg acc gat gct ttc gcc gca ccc gga    1783
Leu Ala Gly Pro Asp Arg Asp Thr Thr Asp Ala Phe Ala Ala Pro Gly
                250                 255                 260

ttt gcg cag gca ctg ccc gcc atg tgg caa cgc gac ttc ggc caa ttc    1831
Phe Ala Gln Ala Leu Pro Ala Met Trp Gln Arg Asp Phe Gly Gln Phe
            265                 270                 275

gca atc gac cat gca gtg gta ccc gtc agc ctc ggc ggt gga ctg ggc    1879
Ala Ile Asp His Ala Val Val Pro Val Ser Leu Gly Gly Gly Leu Gly
        280                 285                 290

gat ggc gac ccg cgt gac ccg gca tgg caa acc gca ttg agc ggt tat    1927
Asp Gly Asp Pro Arg Asp Pro Ala Trp Gln Thr Ala Leu Ser Gly Tyr
    295                 300                 305

ttg gca aac gca gga ata cgc agc gca ttt ctc ggc agt tgg gaa acg    1975
Leu Ala Asn Ala Gly Ile Arg Ser Ala Phe Leu Gly Ser Trp Glu Thr
310                 315                 320                 325

ggc aat gcc aac aac ggc ggc ctg ttg gcg ccg gat ggc agc ccc cgc    2023
Gly Asn Ala Asn Asn Gly Gly Leu Leu Ala Pro Asp Gly Ser Pro Arg
                330                 335                 340

gca gac aaa ctg ctg atc ttg cgt cat gcc tgg ggc agg tta ccc gtg    2071
Ala Asp Lys Leu Leu Ile Leu Arg His Ala Trp Gly Arg Leu Pro Val
            345                 350                 355

atg ccc gcc att gcg aca gca acc ggc gac agc acg aag aat gcg agt    2119
Met Pro Ala Ile Ala Thr Ala Thr Gly Asp Ser Thr Lys Asn Ala Ser
        360                 365                 370

ggg aag aag ccg tgg aat agt act ttc acc ggc acc gcc acc gtg acc    2167
Gly Lys Lys Pro Trp Asn Ser Thr Phe Thr Gly Thr Ala Thr Val Thr
    375                 380                 385

ggc tcc ggc tac tct ggc ggc gcg ctc ctg ctg gac ccc att ccg agt    2215
Gly Ser Gly Tyr Ser Gly Gly Ala Leu Leu Leu Asp Pro Ile Pro Ser
390                 395                 400                 405

gat gcc ttc atc acc gcg ctc aac ccg gtg caa ctg aac ttc ggt ggc    2263
Asp Ala Phe Ile Thr Ala Leu Asn Pro Val Gln Leu Asn Phe Gly Gly
                410                 415                 420

gtc aag gcc gcg ctt gcc ggc gcg tac ctg cag gtg aac ggc ccc aag    2311
Val Lys Ala Ala Leu Ala Gly Ala Tyr Leu Gln Val Asn Gly Pro Lys
            425                 430                 435

ggc acc acc acg gtc tac gtg acc gac ctg tat ccg gag ggc gca tcc    2359
Gly Thr Thr Thr Val Tyr Val Thr Asp Leu Tyr Pro Glu Gly Ala Ser
        440                 445                 450
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ggc ggc ctg gat cta tcg cac aac gcg ttc gcg gcg atc ggc gac atg    2407
Gly Gly Leu Asp Leu Ser His Asn Ala Phe Ala Ala Ile Gly Asp Met
    455                 460                 465

gtg cag ggg cgc atc ccg atc agc tgg aaa gtg gta cgc gcg ccg gtc    2455
Val Gln Gly Arg Ile Pro Ile Ser Trp Lys Val Val Arg Ala Pro Val
470                 475                 480                 485

acc ggc aac ctg caa tac cgc atc aag gaa ggc agc tca cgc tgg tgg    2503
Thr Gly Asn Leu Gln Tyr Arg Ile Lys Glu Gly Ser Ser Arg Trp Trp
                490                 495                 500

gcg gcg atc cag gtg cgc aac cac gcc tat ccg gtg gtg aag ctg gag    2551
Ala Ala Ile Gln Val Arg Asn His Ala Tyr Pro Val Val Lys Leu Glu
            505                 510                 515

gtg aag caa ggc agc acc tgg aag aac ctg cag aag atg gac tac aac    2599
Val Lys Gln Gly Ser Thr Trp Lys Asn Leu Gln Lys Met Asp Tyr Asn
        520                 525                 530

cac ttc ctg ggc gag caa ctg ggc aac caa ccg cta acc ctg cgc atc    2647
His Phe Leu Gly Glu Gln Leu Gly Asn Gln Pro Leu Thr Leu Arg Ile
    535                 540                 545

acc gac att cgc ggc aag gtc ctc acc gat acc ttg cca cgt ctg cca    2695
Thr Asp Ile Arg Gly Lys Val Leu Thr Asp Thr Leu Pro Arg Leu Pro
550                 555                 560                 565

gaa gac ggc agc aag ccg gcg tat ttc gaa ccg ggg cat gtg cag ttt    2743
Glu Asp Gly Ser Lys Pro Ala Tyr Phe Glu Pro Gly His Val Gln Phe
                570                 575                 580

ccg tag cgcgaacagg tggtttgcct gaactgagcg ttggattggt taacgggcgt     2799
Pro

ggacttgttt agatcgtttg cttgtctaga gcgacaagcg ctttcagcgc cgctagttga  2859

tctcgctggg tcagcccggt gcgtgcgagt cgctgtcacg caccggctgt acgcaccggc  2919

cgtcgccacg ttggtgcccg tgcaactgct tcacacacgc agcgccagag acacagtcat  2979

cagcttcagc gagccagcct tacgcagttg cgcgcgtgtg gccaacgctt ggccgctcga  3039

gtagagcacc gtgaatcgcc agcaataccg accaaatagc ggtatacgct aattggcgct  3099

gttgtaaacg gcaatgaggc catgctgtta ttaccatgcg cctctggcag cgaacgacgg  3159

cgcggcttct atgcaacgtc gcatcggcct ctacttgggt agtttcgccg gtgcaatcca  3219

ggtgcatcaa ccacccgcca ggccaccacc gacgcgcccg ggtaatgcct gatcgtcgtc  3279

gtcctcgggg ttgtcgagat cgcccacttc atcgtcgata ccgccgcgcc gtggcgaggg  3339

gtcgttcgag ggcggcaagt cgtcgtcgcg ttgcggcccc ggcgtgccgt gcaagcgaaa  3399

ctgcgagaca acggacgcag gcggatcggt gttgagcgaa tacaggatca tgcgtcatct  3459
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ccggctggga acctgtgctc gacgctagtg cgcgcagcgc tagcaggccg tgagccgcag 3519

cgcgtgcgcg ctgacatgcc gttgacgctg agcgcgcacc gctgcgctgt ggttgcctgc 3579

gggccagtgg ctatcatggg gctccgccct ccaggccgcc gtcatgcgcc cacgtcttct 3639

gatcatgctg ctgctcctgt gcggcgccgc tacggcagca gcaccggcct cgcgcctgga 3699

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acatccaaca taatccaggg aaatatactt ttccgcccca ctcctaaagt cgaaaataaa 240

acatttctgg cagcattaaa taactttcga tattatcttt atgaatcaac tctccgaata 300

aacgatatcc gtctgcgtct gcgttggcgt tggcgttggc gttggcgtct ccacataatc 360

ggcatctgca ataactccac acctttcgca gatggtgagc gtagtcgtcc acagttccag 420

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cgcctgggcg tcagcccgct gcagctgcgc tcaaacgggc aacggaatcg acgcattgcg 720

ccgaccgatg cgcgaatacg gcgagcagct tgaatgcgac ataccgcacc atctcctgcg 780

ccgatcgccc ccggcgcagg accaccgatg cacgcgcatc tggggcgcgt tcggttgcgc 840

acgtgcatca ctcaccccga gcgggcatcc atcgagagaa accaccagtc acggagaatc 900

acgcgacatc ttgatatttc actaattaca caccgtttca ccatttccca tctcaaggcg 960

aaattcaatg tcatcttcga caaacctccg accctgcgtc aca tcc aag ctc gcc 1015
Thr Ser Lys Leu Ala

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gtt tcg ttg ctg aca ggc gcg ctg ctc gtt ccc gtt gcc gca tcc gcc      1063
Val Ser Leu Leu Thr Gly Ala Leu Leu Val Pro Val Ala Ala Ser Ala
                10                  15                  20

cag agc cat gtc gac aac ccg ttt gtc ggc gcg agc ggg tat ctc aat      1111
Gln Ser His Val Asp Asn Pro Phe Val Gly Ala Ser Gly Tyr Leu Asn
            25                  30                  35

ccc gat tat tcg aag gaa gtc aac tcg tcg atc gtc aag gtc aag gat      1159
Pro Asp Tyr Ser Lys Glu Val Asn Ser Ser Ile Val Lys Val Lys Asp
        40                  45                  50

gtg caa ctg aaa gcc aag atg cag gtc gtc aag tcc tat ccg acc tcc      1207
Val Gln Leu Lys Ala Lys Met Gln Val Val Lys Ser Tyr Pro Thr Ser
    55                  60                  65

gtc tgg ctg gat tcg atc aac gcg atc tat ggc ggc tcg cgc aac gcc      1255
Val Trp Leu Asp Ser Ile Asn Ala Ile Tyr Gly Gly Ser Arg Asn Ala
70                  75                  80                  85

ggc cgc cta agt ctg caa ggc cac ctg gat gcg gca ttg gcg cag aaa      1303
Gly Arg Leu Ser Leu Gln Gly His Leu Asp Ala Ala Leu Ala Gln Lys
                90                  95                  100

aag gcc aat acg cct atc acg gtc ggc ttt gtc att tac gac atg ccg      1351
Lys Ala Asn Thr Pro Ile Thr Val Gly Phe Val Ile Tyr Asp Met Pro
            105                 110                 115

ggg cgc gac tgc cat gcg ctg gcc tcc aac ggc gag cta cca ctg acg      1399
Gly Arg Asp Cys His Ala Leu Ala Ser Asn Gly Glu Leu Pro Leu Thr
        120                 125                 130

caa gcc ggc ttg cag cgc tac aag acc gaa tac atc gac gtc atc gca      1447
Gln Ala Gly Leu Gln Arg Tyr Lys Thr Glu Tyr Ile Asp Val Ile Ala
    135                 140                 145

tcg acg ttg gcc aat ccg aaa tac aaa gat ctt cgg atc gtc aac atc      1495
Ser Thr Leu Ala Asn Pro Lys Tyr Lys Asp Leu Arg Ile Val Asn Ile
150                 155                 160                 165

atc gag ccg gac agc ctt ccg aat ctt gtc acc aat caa agc acg ccc      1543
Ile Glu Pro Asp Ser Leu Pro Asn Leu Val Thr Asn Gln Ser Thr Pro
                170                 175                 180

gcc tgc ggc cag gcg gca tcc agc ggc att tac gag gcc gcc atc aag      1591
Ala Cys Gly Gln Ala Ala Ser Ser Gly Ile Tyr Glu Ala Ala Ile Lys
            185                 190                 195

tac gcg ctc gac aag ctc cat gcc act ccc aat ctt tac aat tac ctg      1639
Tyr Ala Leu Asp Lys Leu His Ala Thr Pro Asn Leu Tyr Asn Tyr Leu
        200                 205                 210

gat atc ggc cat tcc ggc tgg ctg ggg tgg gat agc aac cgt agc ccg      1687
Asp Ile Gly His Ser Gly Trp Leu Gly Trp Asp Ser Asn Arg Ser Pro
    215                 220                 225
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gca att tcg cta tac aca cgg gtc gtg cag gga acg gca gcc ggt ttg    1735
Ala Ile Ser Leu Tyr Thr Arg Val Val Gln Gly Thr Ala Ala Gly Leu
230                 235                 240                 245

gcc agt gcg gat ggc ttc atc acc aac acc gcc aat tac acg ccg ctt    1783
Ala Ser Ala Asp Gly Phe Ile Thr Asn Thr Ala Asn Tyr Thr Pro Leu
                250                 255                 260

cat gag ccg aac ctg ccc aat ccg gac ctg acg atc ggt ggc cag ccc    1831
His Glu Pro Asn Leu Pro Asn Pro Asp Leu Thr Ile Gly Gly Gln Pro
            265                 270                 275

att cgc tcg tcc aac ttc tat caa tgg aac agt ttc ttc gac gaa tcg    1879
Ile Arg Ser Ser Asn Phe Tyr Gln Trp Asn Ser Phe Phe Asp Glu Ser
        280                 285                 290

acc tat gcg gaa gcg ctc tac aac ggc ttc gtc ggc gcg ggt tgg tcc    1927
Thr Tyr Ala Glu Ala Leu Tyr Asn Gly Phe Val Gly Ala Gly Trp Ser
    295                 300                 305

agc aag atc ggc ttt ctg atc gac acc ggt cgc aac ggc tgg ggc ggc    1975
Ser Lys Ile Gly Phe Leu Ile Asp Thr Gly Arg Asn Gly Trp Gly Gly
310                 315                 320                 325

aaa gcg cgc cct gca tct gcc agc ggc aat gac atc aac acc tac gtg    2023
Lys Ala Arg Pro Ala Ser Ala Ser Gly Asn Asp Ile Asn Thr Tyr Val
                330                 335                 340

gac tcc gga cgc gtg gac cgt cgc ctc cat cgc ggc aac tgg tgc aat    2071
Asp Ser Gly Arg Val Asp Arg Arg Leu His Arg Gly Asn Trp Cys Asn
            345                 350                 355

cag agt ggt gcg ggg atc ggc atg ccg ccg acc gcg gca ccc ggc ggg    2119
Gln Ser Gly Ala Gly Ile Gly Met Pro Pro Thr Ala Ala Pro Gly Gly
        360                 365                 370

cat atc cat gcc ctt gtg tgg ggt aag gga ccg ggc gaa tcc gac ggc    2167
His Ile His Ala Leu Val Trp Gly Lys Gly Pro Gly Glu Ser Asp Gly
    375                 380                 385

gcc agc aag tcc atc gcc aac aac cag ggc aag ggc ttc gac aga tac    2215
Ala Ser Lys Ser Ile Ala Asn Asn Gln Gly Lys Gly Phe Asp Arg Tyr
390                 395                 400                 405

tgc gac ccg acc tat acg acg ccg gac ggc acg ttg acg ggt gcc ttg    2263
Cys Asp Pro Thr Tyr Thr Thr Pro Asp Gly Thr Leu Thr Gly Ala Leu
                410                 415                 420

ccg aac gcg ccg atc gcc ggt aac tgg ttc cac gcg cag ttc ctc cag    2311
Pro Asn Ala Pro Ile Ala Gly Asn Trp Phe His Ala Gln Phe Leu Gln
            425                 430                 435

ttg gtc gcc aac gcg tat ccc gcc atc ggc acc tcg acc aag gcg gcg    2359
Leu Val Ala Asn Ala Tyr Pro Ala Ile Gly Thr Ser Thr Lys Ala Ala
        440                 445                 450
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ctg cag tcg gcg tcg acc gac gcg gtg ccc gcc agt cgg ccg acg gcg    2407
Leu Gln Ser Ala Ser Thr Asp Ala Val Pro Ala Ser Arg Pro Thr Ala
    455                 460                 465

acc aag ggg ttg acc gcc aat gca gcg gat ggc gag gtc agg ctc agc    2455
Thr Lys Gly Leu Thr Ala Asn Ala Ala Asp Gly Glu Val Arg Leu Ser
470                 475                 480                 485

tgg tcg ccc gtt gcc ggt gcc acg ggt tac acg gtg caa cgt gtc gcc    2503
Trp Ser Pro Val Ala Gly Ala Thr Gly Tyr Thr Val Gln Arg Val Ala
                490                 495                 500

gac gca acc gct gct ccc atc acc gtc gca tcg ggc ctg acc tcg ccc    2551
Asp Ala Thr Ala Ala Pro Ile Thr Val Ala Ser Gly Leu Thr Ser Pro
            505                 510                 515

tca tat gtg gac cag acg ctc acc aac ggc acc acg tac tac tac aag    2599
Ser Tyr Val Asp Gln Thr Leu Thr Asn Gly Thr Thr Tyr Tyr Tyr Lys
        520                 525                 530

gta acg gcc aac ggc gca tcg ggt gca gac gcg agc tcg gtc acc gtg    2647
Val Thr Ala Asn Gly Ala Ser Gly Ala Asp Ala Ser Ser Val Thr Val
    535                 540                 545

agc gcg aca ccg cat cgg tga tacgataact gcgttgccac agagcggtag       2698
Ser Ala Thr Pro His Arg
550                 555

aggctagtgt gctctaccgc tcctcggccg cgggaggagc gctgcaacca cgatggcggc  2758

gccttgcgcc cgccatttca atcgctgtcg tgctgctcta cctctgtctg gagcgcggca  2818

tgcgcttcga atgagatgac atcggagcag atgccgtcgc tggcggaacg ggcgctgcat  2878

ggcacaggct cggtagcgcc acggcaagcg gcgcagcgtc cactccgtgc cgctgacggc  2938

caacccggcc tgtggcatgc cgggactgca tcgcgcgcgt tgccggggag ctgcgccctt  2998

ttgtctccac ccgcacaggc cgcttcgcac gcaaccgtac ataacacact ccagaagacg  3058

tccatgccat cacatatcca tttcttgatc gcgctcgcaa cgctcatccc ggtcaccgcg  3118

ccggcgatgc aggtcagtac gcaagctccc cttgtcgatg caacaggtca gacgctgcac  3178

attcgcgggg tcacctggcc cggcttcgat cgcgccgggt tggcggccgt cggcatgcgc  3238

aacaacacac tggcgcaact gctggatcgg atgcaggcgt cagacatcaa tgccgtacgt  3298

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ccgctcctgg gcgcacagca gcaagcatgg acgcgcggcc tggttacgct ggcacgccgc  3538

tatggcggca acgccaatgt cctgggcatt gaccttggca gcagcggcta tcgcaatgcc  3598
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agggtgctgg 3668

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aacaggctgg cggccgcatt ggccaggccc aggccggtgc attcgcggtt cttgttgctg 180

ggcgtgtcgg tgagttcatc gaccacgcgc gcggtcatca tcgattcgag caggcccacc 240

attgcgatgg ccagcgccgg cagcgcgatg atgcgcaagg tctccagcgt caacggcacg 300

ccgggccatt gcaggaacgg cagcgcggtg ggcagcttgc ccaggtcggc caccgtcttc 360

agcggcaggt gcagcgcgct gctggccacc gtgagcagca ggatgcacag cagcggcgac 420

ggaatggctg agacaccggg cagccgcaac cgcggcaggc cgtagatgat ggccaggccc 480

acgcccagcg tgacccaggt ggtggggttg gcaccgagca ggtgcggcag ctgcgcggcg 540

aagatcagca ccgccagcgc gttgacgaac ccggtccgca ccgagctgct gacaaagcgc 600

atcagcacgc ccaggcgcag cagcccgaac acgatctgca ccagcccggc gagcagcccg 660

gcggcgagca gatacggcaa cccatgcgtg gccaccagcg gcgcagccac cagcgccacc 720

gagccggcgg ctgcggaaat catcgccggc cgtccgccac aaaacgcgat cacgatgccg 780

atcacaaacg acgcgaacaa gccgacctgc gggtccacgc ctgcgacgaa cgcaaaggcg 840

atgacttcgg gaatcagggc gaacgtggca acggcgccag ccatcagttc gcgcgcaggc 900

gaggcgcgcc attgcgccag ttcggtgcgc aggaaggaca tgggggacac tccagggaca 960

agaacgacag tcctgcggac agcgcgcagg gggcactagt gtg cgg gaa agc gac 1015
Val Arg Glu Ser Asp
1 5

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cgc tcc cgc agc cgc gat gtg atc ggt gcg gca atg gtg ttt tct gtg    1063
Arg Ser Arg Ser Arg Asp Val Ile Gly Ala Ala Met Val Phe Ser Val
                10                  15                  20

ggg acg atc aca cca cgc gac gcg cgc aca gac caa gat gcc cgc ctt    1111
Gly Thr Ile Thr Pro Arg Asp Ala Arg Thr Asp Gln Asp Ala Arg Leu
            25                  30                  35

acc gcg ctc ggg tgt cga gcc cgg ttc tct agg gag atc acc atg tcc    1159
Thr Ala Leu Gly Cys Arg Ala Arg Phe Ser Arg Glu Ile Thr Met Ser
        40                  45                  50

ata ttc agg acc gca agc acg ctc gct ttg gcc acc gcc ctc gca ctg    1207
Ile Phe Arg Thr Ala Ser Thr Leu Ala Leu Ala Thr Ala Leu Ala Leu
    55                  60                  65

gcc gcc ggg ccg gcc ttc agc tat tcc atc aac aac agc agg cag atc    1255
Ala Ala Gly Pro Ala Phe Ser Tyr Ser Ile Asn Asn Ser Arg Gln Ile
70                  75                  80                  85

gtc gac gac agc ggc aag gtc gtg cag ctc aag ggt gtg aac gtg ttc    1303
Val Asp Asp Ser Gly Lys Val Val Gln Leu Lys Gly Val Asn Val Phe
                90                  95                  100

ggc ttc gaa acc ggc aac cac gtg atg cat ggc ctg tgg gca cgc aac    1351
Gly Phe Glu Thr Gly Asn His Val Met His Gly Leu Trp Ala Arg Asn
            105                 110                 115

tgg aag gac atg atc gtg cag atg cag ggc ctg ggc ttc aac gcc gtg    1399
Trp Lys Asp Met Ile Val Gln Met Gln Gly Leu Gly Phe Asn Ala Val
        120                 125                 130

cgc ctg ccg ttc tgc ccg gcc acg ctg cgt agc gac acc atg ccg gcc    1447
Arg Leu Pro Phe Cys Pro Ala Thr Leu Arg Ser Asp Thr Met Pro Ala
    135                 140                 145

agc atc gac tac agc cgc aac gcc gac ctg cag ggc ctg acc tcg ctg    1495
Ser Ile Asp Tyr Ser Arg Asn Ala Asp Leu Gln Gly Leu Thr Ser Leu
150                 155                 160                 165

cag atc ctc gac aag gtg atc gcc gaa ttc aat gcg cgc ggc atg tat    1543
Gln Ile Leu Asp Lys Val Ile Ala Glu Phe Asn Ala Arg Gly Met Tyr
                170                 175                 180

gtg ctg ctg gat cac cac acc ccc gat tgc gcc ggc att tcc gag ctc    1591
Val Leu Leu Asp His His Thr Pro Asp Cys Ala Gly Ile Ser Glu Leu
            185                 190                 195

tgg tac acc ggc tcc tat acc gag gca cag tgg ctg gcc gac ctg cgc    1639
Trp Tyr Thr Gly Ser Tyr Thr Glu Ala Gln Trp Leu Ala Asp Leu Arg
        200                 205                 210

ttt gtg gcc aac cgc tac aag aac gtg ccg tat gta ctc ggc ctg gat    1687
Phe Val Ala Asn Arg Tyr Lys Asn Val Pro Tyr Val Leu Gly Leu Asp
    215                 220                 225
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ctg aag aac gaa ccg cac ggc gcc gcc acc tgg ggt acc ggc aac gcc    1735
Leu Lys Asn Glu Pro His Gly Ala Ala Thr Trp Gly Thr Gly Asn Ala
230                 235                 240                 245

gcc acc gat tgg aac aag gct gcc gag cgc ggc tcg gcc gcg gtg ttg    1783
Ala Thr Asp Trp Asn Lys Ala Ala Glu Arg Gly Ser Ala Ala Val Leu
                250                 255                 260

gcg gtc gcg ccg aaa tgg ctg atc gcg gtg gaa ggc atc acc gac aac    1831
Ala Val Ala Pro Lys Trp Leu Ile Ala Val Glu Gly Ile Thr Asp Asn
            265                 270                 275

ccg gtg tgc tcc acc aac ggc ggc atc ttc tgg ggc ggc aac ctg cag    1879
Pro Val Cys Ser Thr Asn Gly Gly Ile Phe Trp Gly Gly Asn Leu Gln
        280                 285                 290

ccg ctg gcc tgc acc ccg ctc aac atc ccg gcc aac cgc ctg ctg ctg    1927
Pro Leu Ala Cys Thr Pro Leu Asn Ile Pro Ala Asn Arg Leu Leu Leu
    295                 300                 305

gcc ccg cac gtg tac ggc ccg gac gtg ttc gtg cag tcg tac ttc aac    1975
Ala Pro His Val Tyr Gly Pro Asp Val Phe Val Gln Ser Tyr Phe Asn
310                 315                 320                 325

gac agc aac ttc ccc aac aac atg ccc gcc atc tgg gaa cgc cat ttc    2023
Asp Ser Asn Phe Pro Asn Asn Met Pro Ala Ile Trp Glu Arg His Phe
                330                 335                 340

ggt cag ttc gcc ggc acg cat gcg ctg ttg ctg ggc gag ttc gat ggc    2071
Gly Gln Phe Ala Gly Thr His Ala Leu Leu Leu Gly Glu Phe Asp Gly
            345                 350                 355

aag tac ggc gaa ggc gac gca cgc gac aag acc tgg cag gac gcg ctg    2119
Lys Tyr Gly Glu Gly Asp Ala Arg Asp Lys Thr Trp Gln Asp Ala Leu
        360                 365                 370

gtg aag tac ctg cgc agc aag ggc atc aac cag ggc ttc tac tgg tcg    2167
Val Lys Tyr Leu Arg Ser Lys Gly Ile Asn Gln Gly Phe Tyr Trp Ser
    375                 380                 385

tgg aat ccc aac agc ggc gac acc ggc ggc atc ctg cgc gat gac tgg    2215
Trp Asn Pro Asn Ser Gly Asp Thr Gly Gly Ile Leu Arg Asp Asp Trp
390                 395                 400                 405

acc agc gtg cgc cag gac aag atg acc ctg ctg cgc acg ctg tgg ggc    2263
Thr Ser Val Arg Gln Asp Lys Met Thr Leu Leu Arg Thr Leu Trp Gly
                410                 415                 420

acc gcc ggc aat acc acg ccg acg ccg act ccc aca cct acg ccc aca    2311
Thr Ala Gly Asn Thr Thr Pro Thr Pro Thr Pro Thr Pro Thr Pro Thr
            425                 430                 435

ccg aca ccg acg cct acc ccc acg ccg acg ccc acc ccg ggc acc agc    2359
Pro Thr Pro Thr Pro Thr Pro Thr Pro Thr Pro Thr Pro Gly Thr Ser
        440                 445                 450

acc ttc agc acc aag gtg atc gtg gac aac agc tgg aac ggc ggc tat    2407
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Thr Phe Ser Thr Lys Val Ile Val Asp Asn Ser Trp Asn Gly Gly Tyr
    455                 460                 465

tgc aac cgc gtg cag gtg acc aac acc ggc acc gcc agc ggc acc tgg    2455
Cys Asn Arg Val Gln Val Thr Asn Thr Gly Thr Ala Ser Gly Thr Trp
470                 475                 480                 485

tcg atc gcg gtg ccg gtc acc ggt acg gtc aac aac gcc tgg aat gcg    2503
Ser Ile Ala Val Pro Val Thr Gly Thr Val Asn Asn Ala Trp Asn Ala
                490                 495                 500

acc tgg tcg cag agc ggc agc acg ctc aga gcc agc ggc gtg gac ttc    2551
Thr Trp Ser Gln Ser Gly Ser Thr Leu Arg Ala Ser Gly Val Asp Phe
            505                 510                 515

aac cgc acc ctg gca gcc ggc gcc acc gcc gag ttc ggc ttc tgc gcc    2599
Asn Arg Thr Leu Ala Ala Gly Ala Thr Ala Glu Phe Gly Phe Cys Ala
        520                 525                 530

gcg agc tga gtgcactgtg gcgggtacgg ctcccgtgtc cgctaccttt            2648
Ala Ser
    535

gcaacatgca gtggcattgt ggaggcgctg cgtagcaggt tgatgatcac ctgcggcgcc  2708

taacccacga cctcgtagga gctttacctc attctcacgg aaaccatacc ctatcatccc  2768

aactagcacc cccacctctt catcctccca atctcccccc ttcacgacat acatcaataa  2828

aaatacgatc ggcatcatca ccctacctct ccattcccag cacctaaaca aaactccact  2888

cgctccaacc atccacaatc cctcgtacca cgacgctcca catacataat aaacatccta  2948

actctacggt agtccacata gactctcacg tcatctcagc taactaccaa ttccttctgc  3008

ccctcaagta tatactattc tcaccaccac agttctaccc tgtcatcgac aaatacgatt  3068

cagatcatgc gccttccgcc aggcacacac gagtaccacc tccccagaaa tnaataacgc  3128

tactccacaa ccacgtaaca agattctagc acatatacan tccatagaac aacctcacga  3188

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ttcgcatgtc acctacgtcc                                              3268
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<222> (1001)..(2002)

<400> 25

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tgggcaaacc gccgcaaggt cgggatctcg tgcagtgctt cttccatcgc cggatcgctc   180

aacgcatacc actgctgcag caaatgaatc cgcaacatcg tcgccagtgc gtacggctgc   240

cgacctggcc ggcccgacac gggatagtgc ggcgcgacca gcccgagcag ttgctgccac   300

gggacgacct gctccatctc ggccaggaag atctcccggc gggtctgctt gcgcttgccc   360

aggccctcag cgtcaccgaa cgtcagttgc atggatcact cctcaacatc aggcgggtag   420

tgtcgcgtat ttgtggtgcg ttgttcagag gttccttagc gcagccaact gcgaacgatg   480

cacgagtgac gctggcgatg tctgccacct cgcgcgccat ttctgcagcg cgtttgtgga   540

actgccacgt gcgcgtgcat cggctcgcag ccacataggc aaccgtgatc acgcgggcgc   600

accgcggtcg ttgcggtgtg gctgcccatg ctgcagtgat cccccgcatg cagtgtttct   660

aggcaggcag ttttttcgcc acaggtctct tggccgacgc gccacgcgcg tcgttgcaag   720

ctgcgcgcac gcgtccatac atgggcatga caaagtgcct ctgtcgcgga tgcgtcgacc   780

agatcctgcc gccactgcga aacaccgcac agcttggaag agtgatacct cgcatctgta   840

gtttcagcgt gccgttgcgc ctagggtaga gacagatgcg ctgttggccg cgtcgcgcgg   900

catgacgttg cgggcagcgt atctcccccg caactgcaag gaacacccca tgtctgcctc   960

cccctcctgg ccacgccagc tgctgcgctg cgcgttggtc atg ctg tgc atc gcc    1015
                                              Met Leu Cys Ile Ala
                                              1               5

acg atg tcc atc gca cag gcg caa agc ccc aat cgt ctg aaa tac gca    1063
Thr Met Ser Ile Ala Gln Ala Gln Ser Pro Asn Arg Leu Lys Tyr Ala
               10                  15                  20

ggc gtc aac atc tcc ggt gcg gag atc cag tcg tcc aaa aaa ccg ggc    1111
Gly Val Asn Ile Ser Gly Ala Glu Ile Gln Ser Ser Lys Lys Pro Gly
           25                  30                  35

gtg ctc aat atc gac tac cgc tat cca acc gcg tcc gag tac agg tac    1159
Val Leu Asn Ile Asp Tyr Arg Tyr Pro Thr Ala Ser Glu Tyr Arg Tyr
       40                  45                  50

ttc gcg ggc aag caa atg aac atc gtg cgc ctg ccg atc ctg tgg gag    1207
Phe Ala Gly Lys Gln Met Asn Ile Val Arg Leu Pro Ile Leu Trp Glu
   55                  60                  65

cgc atg cag ccc aaa gct caa ggt ccg ctg gat cag gca caa ctg gca    1255
Arg Met Gln Pro Lys Ala Gln Gly Pro Leu Asp Gln Ala Gln Leu Ala
70                 75                  80                  85

ttg ctg aag cag gca gtg gcc aac gcc aag gcc gcc aat caa tac ctg    1303
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Leu Leu Lys Gln Ala Val Ala Asn Ala Lys Ala Ala Asn Gln Tyr Leu
                90                  95                 100

att atc gat gtg cac aac tac gcc aag tac tac ggc cag aag att ggc    1351
Ile Ile Asp Val His Asn Tyr Ala Lys Tyr Tyr Gly Gln Lys Ile Gly
            105                 110                 115

agt aag cgg gtg ccg gtg cgc acg ttc acc gat ctc tgg cgc cgt ctg    1399
Ser Lys Arg Val Pro Val Arg Thr Phe Thr Asp Leu Trp Arg Arg Leu
        120                 125                 130

gcc atc gcg ttc aag agc gac aac gcc gtg att ttc ggg ctg atg aac    1447
Ala Ile Ala Phe Lys Ser Asp Asn Ala Val Ile Phe Gly Leu Met Asn
    135                 140                 145

gag ccg tac gac atc tcg cca gag agt tgg gcc gcc gcc gcg cag gcg    1495
Glu Pro Tyr Asp Ile Ser Pro Glu Ser Trp Ala Ala Ala Ala Gln Ala
150                 155                 160                 165

tcc atc gac agc att cgt gcc acc ggt gcc acc aac ctg att ctg gtg    1543
Ser Ile Asp Ser Ile Arg Ala Thr Gly Ala Thr Asn Leu Ile Leu Val
                170                 175                 180

ccc ggt gca ttg tgg tcg ggc gca cac agc tgg tat tcc acc gtg gcc    1591
Pro Gly Ala Leu Trp Ser Gly Ala His Ser Trp Tyr Ser Thr Val Ala
            185                 190                 195

ggg cag tcc aat gca gtg gcg ctt gcg aac atc cgc gac cca ttg aat    1639
Gly Gln Ser Asn Ala Val Ala Leu Ala Asn Ile Arg Asp Pro Leu Asn
        200                 205                 210

cgc tat gcg atc gaa gtc cat caa tac ctg gac acc gac tcc agc ggc    1687
Arg Tyr Ala Ile Glu Val His Gln Tyr Leu Asp Thr Asp Ser Ser Gly
    215                 220                 225

acc agt gcc ggt tgt gtg agc cgc acg atc ggt gcg gag cgc ttg cgc    1735
Thr Ser Ala Gly Cys Val Ser Arg Thr Ile Gly Ala Glu Arg Leu Arg
230                 235                 240                 245

agt ttc acc ggc tgg ctg cgc gcg caa ggc aag cgc ggt ttt ctt ggc    1783
Ser Phe Thr Gly Trp Leu Arg Ala Gln Gly Lys Arg Gly Phe Leu Gly
                250                 255                 260

gaa ttc ggc acc gcc aat aac gca acc tgc act gcg gcg ctg gac ggc    1831
Glu Phe Gly Thr Ala Asn Asn Ala Thr Cys Thr Ala Ala Leu Asp Gly
            265                 270                 275

atg ctc ggt tat ctc gaa acc aac cac gat gtg tgg atc ggt tgg acg    1879
Met Leu Gly Tyr Leu Glu Thr Asn His Asp Val Trp Ile Gly Trp Thr
        280                 285                 290

ttc tgg gcg gca ggc gcg tgg tgg aac acc agc tat ccg ttc aat gtg    1927
Phe Trp Ala Ala Gly Ala Trp Trp Asn Thr Ser Tyr Pro Phe Asn Val
    295                 300                 305

cag ccc gat gcg caa ggc cgc gac aag ccg cag atg aaa acc ttg agc    1975
Gln Pro Asp Ala Gln Gly Arg Asp Lys Pro Gln Met Lys Thr Leu Ser
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310 315 320 325

gca cgc gcg cat cgc gtc acc cga taa cgggcatcga tcagttcgct 2022
Ala Arg Ala His Arg Val Thr Arg
330

tgtgtacaac tgcagcagcc gacgcacgca gtagacctgt actgctggtg cgtcggttgc 2082

atgcgtagcc ggagatttgg cgtcacgctt tcgtcgccta gcaaatcgca tgtcgagatt 2142

tcgtcgcggt cgcgtcacgc gtgaaagcgc aatctccctt gaaagcaggc acaaccgcac 2202

gaacccggtg ccagctcctc ccacgccgca taaagtgcag gccacaacgc agtttgtttg 2262

tgagctcctg cgcacatcat ctttaaccac cgcgcgatgc gcggctggca cgcgtgatgc 2322

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gactggaatg aacgtgattc gcctgccgat cctgtgggaa cgtctgcaac ctgccgcacg 2682

cggcgagctg gatccggcgc agctggcact ggtgcagcaa gcggtggcac gcgccaaggc 2742

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cttcaacagc gataacgccg tgatcttcgg gctgatgaat gagcccaaca acatctctgc 2922

cagcgaatgg gccggtgcag cgcaggcagg catcgatgcg atccgtgcca ccggcgccaa 2982

caatctgatc ctggtaccgg 3002

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<213> Xanthomonas campestris

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ctggtattcc accgtggccg ggcagtccaa tgcagtggcg cttgcgaaca tccgcgaccc 180

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attgaatcgc tatgcgatcg aagtccatca atacctggac accgactcca gcggcaccag   240

tgccggttgt gtgagccgca cgatcggtgc ggagcgcttg cgcagtttca ccggctggct   300

gcgcgcgcaa ggcaagcgcg gttttcttgg cgaattcggc accgccaata acgcaacctg   360

cactgcggcg ctggacggca tgctcggtta tctcgaaacc aaccacgatg tgtggatcgg   420

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cgatgcgcaa ggccgcgaca agccgcagat gaaaaccttg agcgcacgcg cgcatcgcgt   540

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gtcgtgttct ctgtggttgc gcaggctaat gtcctgcgcg gtg ttc ttc ctg ctg    1015
                                              Val Phe Phe Leu Leu
                                              1               5

ctc ggt gtt ctg ccg atg ggc cat gca caa acg cgt gca ctc aag tac    1063
Leu Gly Val Leu Pro Met Gly His Ala Gln Thr Arg Ala Leu Lys Tyr
                10                  15                  20

gcc ggc gtc aat ttg gcg ggt gcg gaa ttt gcg tca tcg aaa aaa cct    1111
Ala Gly Val Asn Leu Ala Gly Ala Glu Phe Ala Ser Ser Lys Lys Pro
            25                  30                  35

ggc gtc ctc aac aag gac tac atg tat ccc gcc agc acc gat tac agc    1159
Gly Val Leu Asn Lys Asp Tyr Met Tyr Pro Ala Ser Thr Asp Tyr Ser
        40                  45                  50

tat ttc gct ggg act gga atg aac gtg att cgc ctg ccg atc ctg tgg    1207
Tyr Phe Ala Gly Thr Gly Met Asn Val Ile Arg Leu Pro Ile Leu Trp
    55                  60                  65

gaa cgt ctg caa cct gcc gca cgc ggc gag ctg gat ccg gcg cag ctg    1255
Glu Arg Leu Gln Pro Ala Ala Arg Gly Glu Leu Asp Pro Ala Gln Leu
70                  75                  80                  85

gca ctg gtg cag caa gcg gtg gca cgc gcc aag gca tcg ggc atg tat    1303
Ala Leu Val Gln Gln Ala Val Ala Arg Ala Lys Ala Ser Gly Met Tyr
                90                  95                  100

ctg gtg ctg gat atc cac aac tac agc aag tac tac ggt tat aaa atg    1351
Leu Val Leu Asp Ile His Asn Tyr Ser Lys Tyr Tyr Gly Tyr Lys Met
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                105                 110                 115

ggt ggg ccg gaa gtg ccg ctc gcc acc ttt gcc gat ctg tgg cgg cgc    1399
Gly Gly Pro Glu Val Pro Leu Ala Thr Phe Ala Asp Leu Trp Arg Arg
        120                 125                 130

ctg gcg gtg atc ttc aac agc gat aac gcc gtg atc ttc ggg ctg atg    1447
Leu Ala Val Ile Phe Asn Ser Asp Asn Ala Val Ile Phe Gly Leu Met
    135                 140                 145

aat gag ccc aac aac atc tct gcc agc gaa tgg gcc ggt gca gcg cag    1495
Asn Glu Pro Asn Asn Ile Ser Ala Ser Glu Trp Ala Gly Ala Ala Gln
150                 155                 160                 165

gca ggc atc gat gcg atc cgt gcc acc ggc gcc aac aat ctg atc ctg    1543
Ala Gly Ile Asp Ala Ile Arg Ala Thr Gly Ala Asn Asn Leu Ile Leu
                170                 175                 180

gta ccg ggc gcg ctg tgg acc ggc gca cac agc tgg cac tcg ctg acc    1591
Val Pro Gly Ala Leu Trp Thr Gly Ala His Ser Trp His Ser Leu Thr
            185                 190                 195

agc gat ggg tat tcc aat gca acc gcg ttg gca tcg atc agc gac cct    1639
Ser Asp Gly Tyr Ser Asn Ala Thr Ala Leu Ala Ser Ile Ser Asp Pro
        200                 205                 210

ctc aat cgc tat gcg ttc gaa gtg cat caa tat ctg gat gcc gat tcc    1687
Leu Asn Arg Tyr Ala Phe Glu Val His Gln Tyr Leu Asp Ala Asp Ser
    215                 220                 225

agc ggc acc tcc agt gtc tgc gtc agt gaa acc atc ggc gcc gat cgc    1735
Ser Gly Thr Ser Ser Val Cys Val Ser Glu Thr Ile Gly Ala Asp Arg
230                 235                 240                 245

ctg cgt gcg ttc acc gaa tgg cta cgc acc aac aac aag cgt ggt ttt    1783
Leu Arg Ala Phe Thr Glu Trp Leu Arg Thr Asn Asn Lys Arg Gly Phe
                250                 255                 260

ctc ggt gag ttc ggc acc gcc aac aac gcc gtc tgc aat acc gcg ctg    1831
Leu Gly Glu Phe Gly Thr Ala Asn Asn Ala Val Cys Asn Thr Ala Leu
            265                 270                 275

caa ggc atg ctg gcc tac atg gaa aac tac gcc gat gtc tgg ctg ggc    1879
Gln Gly Met Leu Ala Tyr Met Glu Asn Tyr Ala Asp Val Trp Leu Gly
        280                 285                 290

tgg aca tgg tgg gca gcg ggc gca tgg tgg aac acc agc tac gcc tac    1927
Trp Thr Trp Trp Ala Ala Gly Ala Trp Trp Asn Thr Ser Tyr Ala Tyr
    295                 300                 305

aac gtg cat ccg aac aag gac ggc acc gac aag ccg cag atg gtc atc    1975
Asn Val His Pro Asn Lys Asp Gly Thr Asp Lys Pro Gln Met Val Ile
310                 315                 320                 325

ctc tcg ccg cag gcc gcg cgc gct aca cgc tga cacgttgtcg catgcccgcc  2028
Leu Ser Pro Gln Ala Ala Arg Ala Thr Arg
                330                 335
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tttcgtagga gg 2040

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<220>
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gtcaccgcgg cggcggcgtc agggcatcgc atgcatttgt tgccaacgca ttgcgaacgc 120

aaccaatgac atcgccttag cgctgcagcc gtcacgctag gtcatcacgc ctcgcagcag 180

gcgcattggc tggaactcca tgtctcgcat tctgttgatc ggcggccacg gcaaggtggc 240

gcgtctgctc accccgctgc tgctggccgg tggccaccac gtcaccgcgc tattccgtaa 300

tcccgaccac gcaagcgatg tgatcgccga tggcgccaca cccgcgctat tcgatatcga 360

acacgccgac accgcggcga tcgccgcgca catcaccggc cacgatgcag ttgtttggtc 420

ggccggtgcc ggcggtggcg atgccgcacg cacctatgcg gtggaccgcg atgccgcgat 480

ccgctcgatg cacgcggccg agcaggcgcg ggtgcggcgc tacgtgatgg tgtcctacct 540

gggcgcgggg ctggagcacg gggtgagccc ggaggatggc ttcttcgctt atgcgcaggc 600

caaggccgct gccgatgcgc acctgcgcgg caccacgctg gactggaccg tgcttgggcc 660

cggccggctc accctggacc cacccagcgg ctgcatcgcc cgcgacccgg gcagcgacac 720

caccgagggc gtatcgcgcg ccaatgtcgc gcaggtgatc gccgccaccc tggccacgcc 780

ggccaccatc ggcaagaccg tgggattcgt ggatgggccc acccccatca cgcaggcgct 840

cgcgcagctg gcatgaacgc cagccggtcc gcagcgcgct gccatggcaa gggccgctgg 900

cagctaacga tttcctaaag tcgcaccgcg catagtcgcc ggcgcagccc ccactgtgga 960

gatcgctatg tctgcgtttg ttgcgccccg ccgcgccggc atc ctg ccg ccg tat 1015
Ile Leu Pro Pro Tyr
1 5

ctg ctg gac cac gtg gcg cag gcc gca ccg gag cgc gca cgg cac tgc 1063
Leu Leu Asp His Val Ala Gln Ala Ala Pro Glu Arg Ala Arg His Cys
10 15 20

gcg cag ctc acc cgc cac atc acc gcg cag ctg cgc cag cgc cgc gcg 1111
Ala Gln Leu Thr Arg His Ile Thr Ala Gln Leu Arg Gln Arg Arg Ala

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                25                  30                  35

cag ggg ttg ctg gcg cgc gac agc gcc gac gat gcg ccc acc gcc acc    1159
Gln Gly Leu Leu Ala Arg Asp Ser Ala Asp Asp Ala Pro Thr Ala Thr
        40                  45                  50

acc gac act gcg gtg cag cgg cat ctc tac gac gcc cag caa ggc act    1207
Thr Asp Thr Ala Val Gln Arg His Leu Tyr Asp Ala Gln Gln Gly Thr
    55                  60                  65

gcc ctg cct ggc gtg ctg gtg cgc gag gaa ggc gcg ccg ccc acc gac    1255
Ala Leu Pro Gly Val Leu Val Arg Glu Glu Gly Ala Pro Pro Thr Asp
70                  75                  80                  85

gat gtc gcc gtg acc gag gct tac gat tac ctc ggc gcc acc cat gcc    1303
Asp Val Ala Val Thr Glu Ala Tyr Asp Tyr Leu Gly Ala Thr His Ala
                90                  95                  100

ttc ttc cag cag gtg tat gcg cgc aac tcg atc gac gat gcc ggc atg    1351
Phe Phe Gln Gln Val Tyr Ala Arg Asn Ser Ile Asp Asp Ala Gly Met
            105                 110                 115

ccg ctg ctt ggt acc gtg cac tac gag cgc aac tac gac aac gcg ttc    1399
Pro Leu Leu Gly Thr Val His Tyr Glu Arg Asn Tyr Asp Asn Ala Phe
        120                 125                 130

tgg acc ggc gag cag atg gtg ttc ggc gat ggc gac ggc gag atc ttc    1447
Trp Thr Gly Glu Gln Met Val Phe Gly Asp Gly Asp Gly Glu Ile Phe
    135                 140                 145

acc cgc ttc acc atc gcc atc gac gtg gtg gcc cac gag ctc acc cac    1495
Thr Arg Phe Thr Ile Ala Ile Asp Val Val Ala His Glu Leu Thr His
150                 155                 160                 165

ggt gtc atc gag cgc acc gcc aac ctg atc tac cag ggc cag tcc ggt    1543
Gly Val Ile Glu Arg Thr Ala Asn Leu Ile Tyr Gln Gly Gln Ser Gly
                170                 175                 180

gcc ttg aac gaa tcg gtc tcc gac gtg ttc ggc gtg ctc gtc aag caa    1591
Ala Leu Asn Glu Ser Val Ser Asp Val Phe Gly Val Leu Val Lys Gln
            185                 190                 195

tac gcg ctg cgc cag gac gcc gcg cag gcc gat tgg ctg gtg ggt gcc    1639
Tyr Ala Leu Arg Gln Asp Ala Ala Gln Ala Asp Trp Leu Val Gly Ala
        200                 205                 210

ggc atg ttc ctg ccc ggc gtg cag ggc gtg gcg cta cgc tcg atg cag    1687
Gly Met Phe Leu Pro Gly Val Gln Gly Val Ala Leu Arg Ser Met Gln
    215                 220                 225

gcg ccg ggc acc gcc tac gat gac ccg gca ttg ggc aag gac ccg caa    1735
Ala Pro Gly Thr Ala Tyr Asp Asp Pro Ala Leu Gly Lys Asp Pro Gln
230                 235                 240                 245

ccg gcg cat atg gac gcc tac gtg gac acg caa gaa gac gac ggc ggc    1783
Pro Ala His Met Asp Ala Tyr Val Asp Thr Gln Glu Asp Asp Gly Gly
                250                 255                 260
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gtg cac tac aac tcc ggt att ccc aac cgc gcc ttc cag cgc gcc gcg    1831
Val His Tyr Asn Ser Gly Ile Pro Asn Arg Ala Phe Gln Arg Ala Ala
            265                 270                 275

gtt gcc atc ggc ggt tac gcc tgg gaa aag gcc ggg cgc atc tgg tac    1879
Val Ala Ile Gly Gly Tyr Ala Trp Glu Lys Ala Gly Arg Ile Trp Tyr
        280                 285                 290

cgc gcc ctc acc ggt ggc gcg ctg tcg gcc agt gcg gac ttc gcc acc    1927
Arg Ala Leu Thr Gly Gly Ala Leu Ser Ala Ser Ala Asp Phe Ala Thr
    295                 300                 305

ttc gcc gca ctc acc gtg cgc gtg gcc agc acc gat tac ggc gcg ggc    1975
Phe Ala Ala Leu Thr Val Arg Val Ala Ser Thr Asp Tyr Gly Ala Gly
310                 315                 320                 325

agt gcc gag gcc agt gcg gtg gaa cag gcc tgg cgc gac gtg ggc gtg    2023
Ser Ala Glu Ala Ser Ala Val Glu Gln Ala Trp Arg Asp Val Gly Val
                330                 335                 340

ctc gca tga ccgtgcaact gccgcccttg caaccgggtg tcgtgttgcg            2072
Leu Ala

gttggcacgc gaaggtggcg tggccgcgtt cccggccatg cgccgcgagc gccagctgct  2132

gctggaagag ctggacgagg tgcaacgcca acacctgggc gcgctgctgg atcagtgcct  2192

ggcgcatgca ctccccgccc cgcaagccgg cggcggcgac cgccgctact tcagcatcat  2252

ctgggatggc gccagcgaac cgctgcgcat ccccgaagaa cacgccccgg cggaaatcgt  2312

acggctgtgg aagcagggca cgttgtagat ggcttgcgcg cgagcgcggc acgcggagac  2372

gcaaagacgc cggtcaacgt tgcgcgcgat cgacgcctcg taggagcaga gcttggtcag  2432

gctcaccacc tcccgggtgg tttcgacttc caagcgcaca cttttgtact gggcatccac  2492

cctggaagtg ggactcaaga aaacattttg tccgtagcac tggcgctctt tgatcgcacc  2552

aaatgcaccc ttgatcgaat ccatcatgat tgatgacccc atgcccccgc tgcggggacg  2612

ccttgcctgg aaatttggtc ttatggcgtt cctttctagc ccagactggg ggagggtt    2670
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<210> 28
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<213> Xanthomonas campestris

<220>
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<222> (1001)..(1870)

<400> 28

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agccggggcg tcgatgcgcg tggcagcgtc caggctggca acgcgcggca gccgctgcgg    60
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cgaaaaatgc tgcacagcat gctgcagcac accggccacc gatgcgcgcg cgggcagggc 120

cgccggtgcc tggcccagcg cccgccaggc cgcgcgcagc gctggcagcg ggtcgctgtc 180

atccactggt tgcgccgcat gcgacttgga aagcttgcgc ccgtcggcgc ccaggatcag 240

cggcagatgc agatagcgcg gcggtgccac gcccagggcc tgctgcagca ccaattggcg 300

cggggtggag tcgagcaggt ccgccccgcg caccacatcg gtgatgccct gcgccgcatc 360

gtcgaccacc accgccagct ggtaggccca gtagccgtcg gcacggcgca gcacgacatc 420

gcccacctcg gcgtacacat cctgggtgat gcgcccctgc agcgcgtcct ggaagcttgc 480

ctgggtgttc ggcggcaccc gcaggcgcac ggcccggcgg atgcccagtg gcgccacgca 540

gacgtggtgg atgccaccca tcacggccag ctctgcgcgg ctgcaactgc attcgaacgc 600

cgcaccggtg cgcagcagcc gcgacagtgc cgcctcgtaa tgcgcatcac ggtcggactg 660

atatagcact ggcccgtcag ggtgcagccc gaacgcagcc agcgtatgca attgacgctc 720

tgaggcgcct ggctcggcac gcggcgggtc gatgtcttcg attcgcacat gccattcgcc 780

accggcatgg cgcgcgagca gccagctgcc caacgcagcc aggagcgagc cgaagtgcag 840

ggggccggtg ggcgagggcg cgaagcggcc gcggtaaggg agtgaggaca tgggcagctg 900

aatcgtcggt caggtgcttg cttgatttca acccgccacg tccgcagatc cgcagcagtt 960

catcctcttt gcgtgcggag ccactgcctc tatgttcaac cgt gtc gtc ctg ttt 1015
Arg Val Val Leu Phe
1 5

ctc ttg acc aac ttt gcg gtg ctg atc ctg gcc ggc att gtg atg tcg 1063
Leu Leu Thr Asn Phe Ala Val Leu Ile Leu Ala Gly Ile Val Met Ser
10 15 20

gtg ctg ggc gtc aat ccg gca cag atg agt ggg ctg ctg gtg atg gcc 1111
Val Leu Gly Val Asn Pro Ala Gln Met Ser Gly Leu Leu Val Met Ala
25 30 35

gcc atc ttc ggc ttc ggc ggc tcg ttc att tcg ttg ctg ctg tcc aag 1159
Ala Ile Phe Gly Phe Gly Gly Ser Phe Ile Ser Leu Leu Leu Ser Lys
40 45 50

ttc atg gcc aag cgc agc acc ggt gcg cag gtg atc acc gag ccg cgg 1207
Phe Met Ala Lys Arg Ser Thr Gly Ala Gln Val Ile Thr Glu Pro Arg
55 60 65

acg cag acc gag cgc tgg ttg gtg gac acg gtg cgc cgc cag gcc cag 1255
Thr Gln Thr Glu Arg Trp Leu Val Asp Thr Val Arg Arg Gln Ala Gln
70 75 80 85

gcg gcc ggt atc ggc atg ccg gaa gtg gcc atc tac gac gga ccg gaa 1303
Ala Ala Gly Ile Gly Met Pro Glu Val Ala Ile Tyr Asp Gly Pro Glu

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                90                  95                  100

atc aac gcc ttc gcc acc ggt gcc aac cgc aac aat gcg ctg gtg gcg    1351
Ile Asn Ala Phe Ala Thr Gly Ala Asn Arg Asn Asn Ala Leu Val Ala
            105                 110                 115

gtt tcc acg ggc ttg ctg cag cac atg cgc gaa gac gag gcc gag gcc    1399
Val Ser Thr Gly Leu Leu Gln His Met Arg Glu Asp Glu Ala Glu Ala
        120                 125                 130

gtg ctg ggc cac gag att gcc cac att gcc aat ggc gac atg gtc acc    1447
Val Leu Gly His Glu Ile Ala His Ile Ala Asn Gly Asp Met Val Thr
    135                 140                 145

atg gcc ttg ctg cag ggc gtg ctg aac acc ttc gtg atc gtg ctg gcg    1495
Met Ala Leu Leu Gln Gly Val Leu Asn Thr Phe Val Ile Val Leu Ala
150                 155                 160                 165

cgc gtg gtg ggc ggc atc atc gac agc gcg ctg tct ggc aat cgc gac    1543
Arg Val Val Gly Gly Ile Ile Asp Ser Ala Leu Ser Gly Asn Arg Asp
                170                 175                 180

agc ggg cgt gga ttt gcc tac tac atc att gtg ttc gtg ctg gag atg    1591
Ser Gly Arg Gly Phe Ala Tyr Tyr Ile Ile Val Phe Val Leu Glu Met
            185                 190                 195

gtg ttc ggc ctg ttc gcc acg atg atc gcg atg tgg ttc tcg cgc cgc    1639
Val Phe Gly Leu Phe Ala Thr Met Ile Ala Met Trp Phe Ser Arg Arg
        200                 205                 210

cgc gag ttc cgt gcc gat gcc ggt ggc gcg cag ctg gcc ggg cgc aac    1687
Arg Glu Phe Arg Ala Asp Ala Gly Gly Ala Gln Leu Ala Gly Arg Asn
    215                 220                 225

aag atg atc gcc gca ttg gag cgc cta tcg ctc aat cac ggc cag aac    1735
Lys Met Ile Ala Ala Leu Glu Arg Leu Ser Leu Asn His Gly Gln Asn
230                 235                 240                 245

acc ttg ccc tcg cag gtg cag gcg ttc ggc att tcc ggc ggt gtg ggt    1783
Thr Leu Pro Ser Gln Val Gln Ala Phe Gly Ile Ser Gly Gly Val Gly
                250                 255                 260

gag ggc ttg cgt cgc ctg ttc ctg agc cac ccg ccg ctg acc gag cgc    1831
Glu Gly Leu Arg Arg Leu Phe Leu Ser His Pro Pro Leu Thr Glu Arg
            265                 270                 275

att gcc gcc ttg cgt gcg tcc aac ggt acg gcg atg taa gccagcggtt     1880
Ile Ala Ala Leu Arg Ala Ser Asn Gly Thr Ala Met
        280                 285

tgcctttcaa caaaaaaccc gcgtcatgcg ggttttttgt tgtggcgtgt ttccttgatt  1940

ctcggcagcg caccgtggcg ataaaccgca cacggcgcca gccagcagca tggcgcctta  2000

cgcgggtggc tatggcctca gccgaactcg tagttcatca gcgggccggt gggcgcgacg  2060

aagtcgcctt gcacgtaatc gacccccgca gtgaagaagc tgctcatcga ctgtgcatcg  2120
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gccacgaact cggccaccgt gaggatgccg gtcggctgcg cccgtgaggt gatctcgcgg 2180

atcttttcct ggctttcgcg ggcagaggcg atgtcgccgg tgatgctgcg gtcgagcttg 2240

aggaacgcgg gctggaagtg tgcgagcagc tggaacgaat ccagtcccga accgaattgc 2300

tccagcccca ccttgcagcc cattgccgag accgaagcca ggaattgctg ggcgttgcgc 2360

aggtgggtga ataccttcga ttccggggtc tgcagccaca accgctctcc tggcacgccg 2420

tagaccgcca gctgttcgcg gatagtgtcg atcatctgtg ggtcggagaa cgaattgggc 2480

ccgatgcgca ccagcaggtg ggtcttgtgc ccggcgcgct ggcgctcgcc cagctggcgg 2540

atggcacgtg ccaccaccca gcggtcgatc tcggtgatca ggtcgtgttc ttcggcaatg 2600

gccatgaacg cattcggcga catcatctcg ccattgcgct ccagccgcag gaacgcctga 2660

tacagctcca gcggctcgcc ctgcaggttg agcacgggct ggtaatgcag caggaagccg 2720

tcgccgatca gcgcctcgcg caactgttcc acccagcgct cgatgcgttc ttcctcggcg 2780

cgatcggcgg cggccgggtc gaagatgctg accgcattgc caccgagctc ggccgtggtg 2840

cgcaccgcct cggtgccgcg gttgagcacc 2870

<210> 29
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<213> Xanthomonas campestris

<220>
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<400> 29

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gtgcgcgcgg cgcacaaggc ctcgtactac gtcatcgcca gcccggccgg cccgtatttc 120

gccaagggcg tggcgccggt gtcgatctgg ttgtccaccg agtacgcacg tgcagccaag 180

ggcggcaccg gcgcggccaa gtgcggcggc aactacgccg cctcgctgct gccgcagcag 240

aaagcctacg cgcagggctg ctcgcaggtg ctgttcctgg acccggtgga aggcaaatac 300

attgaagaac tgggcggcat gaacgtgttc ctggtctaca aggacggcac gctggtgacc 360

ccagagctgt ccggcagcat cctggaaggc atcacccgcg acagcatcct gcagctggcc 420

cgtgaccgcg gcatgcaggt ggtggagcgc aaggtgtcca tcgacgagtg gaaggacggc 480

gtggcctccg gcgagatcag cgaggtgttc gcctgcggca cggcggctgt ggttaccccg 540

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atcggcgagc tgaagggcga tggctttgcg gtcggcgacc tgtctgcacc ggcgggcgag   600

gtgacgatgt cgctgcgcca ggagctgacc gacatccagt acgggcgcgt gccggaccgc   660

cacggttggc tggtgcgtct gtcctaagcc aacacgtcaa gccaaatcag ggcccctgcg   720

cgtcagcgca ggggcttttt tttgcgcgca gtgcagcaag tgcgtgtcat ttggtgtcgc   780

cgcatgtcat cgcgagactg aacggtgccg tacggtgtca caaatctgat atttaatttt   840

ttgaaagtgc gaagttctta ttgtccagtt cggttggatt gcggtaggtt cgctgaacgg   900

atcgataaca ggggcgatcc ggggacctcg gcgctgacct acggaaggcg gcgccggata   960

acaccgctcc ggcggttctc ttgatatgga agggaattcg atg tcg act gcg tct    1015
                                            Met Ser Thr Ala Ser
                                            1               5

ctc cgc aag cgt act ggc tcg ctc acc atc ctg ggc gcg tcc gcc ctg    1063
Leu Arg Lys Arg Thr Gly Ser Leu Thr Ile Leu Gly Ala Ser Ala Leu
                10                  15                  20

acc tcg ctg ctg ctc gcg atg ccg gcc ttt gcc ggc gag gtc tac ctg    1111
Thr Ser Leu Leu Leu Ala Met Pro Ala Phe Ala Gly Glu Val Tyr Leu
            25                  30                  35

gat ggc ctg gcc acc gca cag acc cat cag aaa ttc atc gtg acc tac    1159
Asp Gly Leu Ala Thr Ala Gln Thr His Gln Lys Phe Ile Val Thr Tyr
        40                  45                  50

aag gac ggc agc acc gcg ctg gcc agc ccg tcc gcg ttg acc acc tcg    1207
Lys Asp Gly Ser Thr Ala Leu Ala Ser Pro Ser Ala Leu Thr Thr Ser
    55                  60                  65

ctg cgc act gct gcg cgc gcg gtg ccg gcc aaa gcc ggc aag gcg ctg    1255
Leu Arg Thr Ala Ala Arg Ala Val Pro Ala Lys Ala Gly Lys Ala Leu
70                  75                  80                  85

ggc ctg aac tcg gtg cgc cgc ctg gcg ttg ggg ccg gaa ctg gta agg    1303
Gly Leu Asn Ser Val Arg Arg Leu Ala Leu Gly Pro Glu Leu Val Arg
                90                  95                  100

gca gac cgc gcc ctg gac cgc gcc gag gcc gaa acc ctg atg cgg caa    1351
Ala Asp Arg Ala Leu Asp Arg Ala Glu Ala Glu Thr Leu Met Arg Gln
            105                 110                 115

ttg gcc gct gat ccc aac gtg cag agc gtt gaa gtc gac cag atc ctg    1399
Leu Ala Ala Asp Pro Asn Val Gln Ser Val Glu Val Asp Gln Ile Leu
        120                 125                 130

cat gcc acg ctc acc ccc aac gac acc cgg ttg tcc gag cag tgg gcg    1447
His Ala Thr Leu Thr Pro Asn Asp Thr Arg Leu Ser Glu Gln Trp Ala
    135                 140                 145

ttc ggc acc acc aac gcc ggc ctg aac atc cgc ccg gcc tgg gac aag    1495
Phe Gly Thr Thr Asn Ala Gly Leu Asn Ile Arg Pro Ala Trp Asp Lys
150                 155                 160                 165
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gcc acc ggc agc ggc acg gtc gtg gcg gtg att gat acc ggc atc acc    1543
Ala Thr Gly Ser Gly Thr Val Val Ala Val Ile Asp Thr Gly Ile Thr
                170                 175                 180

agt cat gcc gac ctc aac gcc aac atc ctc gcg ggc tac gac ttc atc    1591
Ser His Ala Asp Leu Asn Ala Asn Ile Leu Ala Gly Tyr Asp Phe Ile
            185                 190                 195

agc gat gcg acc acc gca cgc gat ggc aac ggc cgt gac agc aac gcc    1639
Ser Asp Ala Thr Thr Ala Arg Asp Gly Asn Gly Arg Asp Ser Asn Ala
        200                 205                 210

gcc gac gaa ggc gac tgg tac gcc gcc aac gaa tgc ggc gcc ggc att    1687
Ala Asp Glu Gly Asp Trp Tyr Ala Ala Asn Glu Cys Gly Ala Gly Ile
    215                 220                 225

ccc gcc gcc agc tcc agc tgg cac ggc acc cat gtg gcc ggc acg gtc    1735
Pro Ala Ala Ser Ser Ser Trp His Gly Thr His Val Ala Gly Thr Val
230                 235                 240                 245

gcg gca gtg acc aac aac acc acc ggc gta gcc ggc acc gcc tac ggc    1783
Ala Ala Val Thr Asn Asn Thr Thr Gly Val Ala Gly Thr Ala Tyr Gly
                250                 255                 260

gcc aag gtc gta ccg gtg cgc gtg ctc ggc aag tgc ggt ggg tcg ctg    1831
Ala Lys Val Val Pro Val Arg Val Leu Gly Lys Cys Gly Gly Ser Leu
            265                 270                 275

tcg gat atc gcc gac gcc atc gtc tgg gcc tcc ggc ggc acc gtc agc    1879
Ser Asp Ile Ala Asp Ala Ile Val Trp Ala Ser Gly Gly Thr Val Ser
        280                 285                 290

ggc atc ccg gcc aat gct aac ccg gcc gag gtg atc aac atg tcg ctc    1927
Gly Ile Pro Ala Asn Ala Asn Pro Ala Glu Val Ile Asn Met Ser Leu
    295                 300                 305

ggc ggc ggc ggt agc tgc tcg acc acc atg cag aac gcc atc aac ggt    1975
Gly Gly Gly Gly Ser Cys Ser Thr Thr Met Gln Asn Ala Ile Asn Gly
310                 315                 320                 325

gcg gtg tcg cgc ggc acc acg gtg gtg gtc gcg gcc ggc aac gat gcg    2023
Ala Val Ser Arg Gly Thr Thr Val Val Val Ala Ala Gly Asn Asp Ala
                330                 335                 340

tcc aat gtg tcc ggt tcg ctg ccg gcc aac tgc gcg aac gtg att gcg    2071
Ser Asn Val Ser Gly Ser Leu Pro Ala Asn Cys Ala Asn Val Ile Ala
            345                 350                 355

gtg gcc gcc acc acc tcg gcg ggc gcg aag gcc agc tat tcc aac ttc    2119
Val Ala Ala Thr Thr Ser Ala Gly Ala Lys Ala Ser Tyr Ser Asn Phe
        360                 365                 370

ggc acc ggt atc gat gtg tcg gcg ccc ggc tcg tcg atc ctg tcc acg    2167
Gly Thr Gly Ile Asp Val Ser Ala Pro Gly Ser Ser Ile Leu Ser Thr
    375                 380                 385
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ctc aac agc ggc acc acc acg ccg ggt agc gcc agc tat gcc tcc tac    2215
Leu Asn Ser Gly Thr Thr Thr Pro Gly Ser Ala Ser Tyr Ala Ser Tyr
390                 395                 400                 405

aac ggc acc tcg atg gcg tcg ccg cat gtg gcc ggc gtg gtc gcg ctg    2263
Asn Gly Thr Ser Met Ala Ser Pro His Val Ala Gly Val Val Ala Leu
                410                 415                 420

gtg cag tcg gtc gcc ccg acc gcg ctg acg cca gca gcg gtg gaa acc    2311
Val Gln Ser Val Ala Pro Thr Ala Leu Thr Pro Ala Ala Val Glu Thr
            425                 430                 435

ttg ttg aag aac acc gcg cgt gct tta ccg ggc gcc tgc tcg ggc ggc    2359
Leu Leu Lys Asn Thr Ala Arg Ala Leu Pro Gly Ala Cys Ser Gly Gly
        440                 445                 450

tgc ggt gcc ggc atc gtc aac gcc gat gcc gcg gtc act gcg gcc atc    2407
Cys Gly Ala Gly Ile Val Asn Ala Asp Ala Ala Val Thr Ala Ala Ile
    455                 460                 465

aat ggc ggg agc ggc ggc ggt ggc ggt ggt gga aac acc ttg acc aac    2455
Asn Gly Gly Ser Gly Gly Gly Gly Gly Gly Gly Asn Thr Leu Thr Asn
470                 475                 480                 485

ggc act ccg gtg acc ggc ctg ggc gcg gcg act ggc gcg gaa ttg aac    2503
Gly Thr Pro Val Thr Gly Leu Gly Ala Ala Thr Gly Ala Glu Leu Asn
                490                 495                 500

tac acc atc acc gtg ccg gcc ggc agc ggc acc ttg acg gtg acc acc    2551
Tyr Thr Ile Thr Val Pro Ala Gly Ser Gly Thr Leu Thr Val Thr Thr
            505                 510                 515

agc ggc ggc agc ggc gat gcc gac ctg tat gtg cgc gcc ggc agt gca    2599
Ser Gly Gly Ser Gly Asp Ala Asp Leu Tyr Val Arg Ala Gly Ser Ala
        520                 525                 530

ccg acc gac tcg gct tac acc tgc cgc cca tac cgc agc ggc aat gcc    2647
Pro Thr Asp Ser Ala Tyr Thr Cys Arg Pro Tyr Arg Ser Gly Asn Ala
    535                 540                 545

gag acc tgc acc atc acc gca ccg tcc gga acg tat tac gtg cgt ctg    2695
Glu Thr Cys Thr Ile Thr Ala Pro Ser Gly Thr Tyr Tyr Val Arg Leu
550                 555                 560                 565

aag gcc tac agc acg ttc tcc ggc gtc acc ctg cgc gcc agc tac taa    2743
Lys Ala Tyr Ser Thr Phe Ser Gly Val Thr Leu Arg Ala Ser Tyr
                570                 575                 580

ccgcgcgtca cgcgcgcccc ggcactgcgc cagggcgcgc tcctcatctg caatccactc  2803

cacgcctgcc gattcggcag gcgctgggaa tgtgttgccg cgtggccggg acggacaccg  2863

gtcagtcgtt tcgacaggca cctgcctgtg cacttccaga cctgccatcg cagcgcgcga  2923

tggggtccgg ccatcacgcc gcatctgcgg cacctcatca ctgaaaggaa cgatcgatgt  2983

ccaatgtgtc gcaacgtcgt gcgcctacgc gcgcgctggt agtcctgggt gtgtccgcgc  3043
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tgacctcgct gctggcggtg ccggccttcg ccgggcaggt gaatctgtcc gggctggatt 3103

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gccgcgcgct gggcctgaac cacgtgcgtc gcaccgcgct gggctccgaa gtgctcaaga 3283

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cacgcgtctg tccgagcagt ggggcttcgg caccaccgca tcgggcatca acgtgcgccc 3463

ggcctgggac accgccaccg gcaccggcgt ggtggtcgcg gtgatcgaca ccggcatcac 3523

cagccatccg gacctcaacg ccaacgtgct gcccggctac gacttcatca gcgatgcggc 3583

gcgtgcgcgc gacaacaacg gccgtgacag caacgcggcc gaccagggcg actggcgcac 3643

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cgagcttctc caacttcggc accaccatcg atatctccgg tccgggctcg gcgatcctgt 180

ccacgctcaa cagcggcacc accaccccgg gcagcgccag ctacgcgtcc tacaatggca 240

cctcgatggc ggcgccgcac gtggccggcg tggtcgcgct ggtgcagtcg gcagcgtcgc 300

gtccgttgac cccggcggcg gtggaaacgc tgttgaagaa caccgcccgg ccgttgccgg 360

gcgcctgctc gggcggttgc ggtgccggca tcgtcaacgc agccggcgcg gtcagccaga 420

cgccgtaacg cgacgccgta acgcgtattt ccccagcgca cagtgccggc gtctgtcaga 480

gcgctcccga cgcggctgtc ggtgcctgtc tctctctctt gtgccccgcc caggcggggc 540

ttttttgtgc gcgcgctgca tgggccggga cgtgcgccag gggtagctga acgaacgcaa 600

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gtgggcggat gctgcctggc ttcagcgcca ttcgggttcg ccgatagcct cgtcacgtgg   660

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catccgagta ccgatatcct ggggagggcg attcatgagg cagtcaacgg ttggcgcagt   780

gcgctacgcg gcgtgtgtgt gtgcgatggc gtgtgtgttt caggtatcgg ccggcgaggt   840

caacctgcag ggcctggcat cgggctcgag ccaccagcgt ttcatcgtca gctacaagga   900

ccgcgtaggc agcacccgcg cgaccgggct gtcggctccg tggggcgaga tcgcccgcgc   960

cgtccctagg cggcaagggc gcgcgctggg cttgtcggcc atg cgt cgg ctc agt    1015
                                              Met Arg Arg Leu Ser
                                              1               5

gcc ggc ccg atg ctg ctg gtg gcc gat cgg cgc ctg gac cgg gtc gac    1063
Ala Gly Pro Met Leu Leu Val Ala Asp Arg Arg Leu Asp Arg Val Asp
                10                  15                  20

tcg gaa agc ctg atg cgc cgg ctt gcc gcc gac ccg acc gtc aag cgg    1111
Ser Glu Ser Leu Met Arg Arg Leu Ala Ala Asp Pro Thr Val Lys Arg
            25                  30                  35

gtg gaa gtg gac gtg ctg atg cgg ccg ctg ctg gcg ccc aac gac ccc    1159
Val Glu Val Asp Val Leu Met Arg Pro Leu Leu Ala Pro Asn Asp Pro
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ggc ctg cca cag cag tgg gcg atg gga acc acc acc gcc agc ctc aat    1207
Gly Leu Pro Gln Gln Trp Ala Met Gly Thr Thr Thr Ala Ser Leu Asn
    55                  60                  65

gtc cgc ccg gcc tgg gac cgc acc acc ggc aag ggc atc gtg gtg gcg    1255
Val Arg Pro Ala Trp Asp Arg Thr Thr Gly Lys Gly Ile Val Val Ala
70                  75                  80                  85

gtg atc gat acc ggc atc acc gcg cat ccg gac ctg gcc gcc aac gtg    1303
Val Ile Asp Thr Gly Ile Thr Ala His Pro Asp Leu Ala Ala Asn Val
                90                  95                  100

ttg ccc ggc tac gac ttc atc acc gac ccc acc gtc gca ggc gac ggc    1351
Leu Pro Gly Tyr Asp Phe Ile Thr Asp Pro Thr Val Ala Gly Asp Gly
            105                 110                 115

aac ggg cgt gac aac aat gcc gcc gat cag ggc gat tgg tcc gcg gcc    1399
Asn Gly Arg Asp Asn Asn Ala Ala Asp Gln Gly Asp Trp Ser Ala Ala
        120                 125                 130

aac gct tgc ggt gcg ggc gcg tcg gcg tcc aat tcc agc tgg cat ggc    1447
Asn Ala Cys Gly Ala Gly Ala Ser Ala Ser Asn Ser Ser Trp His Gly
    135                 140                 145

acc cat gtc gcc ggc atc gtt gcc gca gtt ggc aac aac gcg gcc ggg    1495
Thr His Val Ala Gly Ile Val Ala Ala Val Gly Asn Asn Ala Ala Gly
150                 155                 160                 165

gtg gtc ggc act gcc ttc aac gcc aaa ctg ttg ccg ttg cgc gtg ctc    1543
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Val Val Gly Thr Ala Phe Asn Ala Lys Leu Leu Pro Leu Arg Val Leu
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ggc aaa tgc ggt ggc tac atg tcc gat atc gcc gat gcc atc gtg tgg    1591
Gly Lys Cys Gly Gly Tyr Met Ser Asp Ile Ala Asp Ala Ile Val Trp
            185                 190                 195

gca tct ggc ggc aag gtg acc ggc gtg ccg gcc aat ccg aat ccc gcc    1639
Ala Ser Gly Gly Lys Val Thr Gly Val Pro Ala Asn Pro Asn Pro Ala
        200                 205                 210

acg gtg atc aac ttg tcg ctc ggc ggc tat ggc agc tgc tcg acg atc    1687
Thr Val Ile Asn Leu Ser Leu Gly Gly Tyr Gly Ser Cys Ser Thr Ile
    215                 220                 225

atc ggc aat gcc atc acc ggc gcg gtc acg cgc ggc acc gcc gtg gta    1735
Ile Gly Asn Ala Ile Thr Gly Ala Val Thr Arg Gly Thr Ala Val Val
230                 235                 240                 245

gtg gcg gcc ggc aac agc aat atg gat gtg gcc acc agc atg ccg gcc    1783
Val Ala Ala Gly Asn Ser Asn Met Asp Val Ala Thr Ser Met Pro Ala
                250                 255                 260

aat tgc gcg aac gtg att gcg gtg gcg gca acc acc tcg gcc ggc gcc    1831
Asn Cys Ala Asn Val Ile Ala Val Ala Ala Thr Thr Ser Ala Gly Ala
            265                 270                 275

aag gcc agc ttc tcc aac ttc ggc aag ggc gtg gac atc gcc gcg ccc    1879
Lys Ala Ser Phe Ser Asn Phe Gly Lys Gly Val Asp Ile Ala Ala Pro
        280                 285                 290

ggc cag gcg atc att tcc acg ctc aat agc ggc acc acg gtt cca gcc    1927
Gly Gln Ala Ile Ile Ser Thr Leu Asn Ser Gly Thr Thr Val Pro Ala
    295                 300                 305

aat ccg gcc tac gcg gtg tat agc ggc acc tcg atg gcg gcg ccg cat    1975
Asn Pro Ala Tyr Ala Val Tyr Ser Gly Thr Ser Met Ala Ala Pro His
310                 315                 320                 325

gtg gcc ggc gtg gtg gcg ttg atg cag tcg gtg gca ctt aac ccg ctg    2023
Val Ala Gly Val Val Ala Leu Met Gln Ser Val Ala Leu Asn Pro Leu
                330                 335                 340

acg ccg gca acg gtg gag gcg ctg ctg aag agc agt gca cgc ccg ttg    2071
Thr Pro Ala Thr Val Glu Ala Leu Leu Lys Ser Ser Ala Arg Pro Leu
            345                 350                 355

ccg gtg gcg tgc gct ccc ggc tgc ggt gcg ggc ctg gtc aat gcc gat    2119
Pro Val Ala Cys Ala Pro Gly Cys Gly Ala Gly Leu Val Asn Ala Asp
        360                 365                 370

ggc gcg gtg gcg gcg gtg atc aat gcc acg ctg ctg acc agt aat gca    2167
Gly Ala Val Ala Ala Val Ile Asn Ala Thr Leu Leu Thr Ser Asn Ala
    375                 380                 385

gta cgc act ggc ctg agc gcg gcg atc ggc gat tcg ctg tat tac cag    2215
Val Arg Thr Gly Leu Ser Ala Ala Ile Gly Asp Ser Leu Tyr Tyr Gln
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390                 395                 400                 405

gtc aag gtg ccg gca ggc acg cgc tcg ctc aag gtc acg ctc agc ggc    2263
Val Lys Val Pro Ala Gly Thr Arg Ser Leu Lys Val Thr Leu Ser Gly
                410                 415                 420

ggc agc ggc aat gcc gac ctg tca ctg cgc gcc aat gca ctg ccc acc    2311
Gly Ser Gly Asn Ala Asp Leu Ser Leu Arg Ala Asn Ala Leu Pro Thr
            425                 430                 435

gac gct gcc ttt ggc tgc cgc agc atg ctg gtc ggc aac acc gaa gcc    2359
Asp Ala Ala Phe Gly Cys Arg Ser Met Leu Val Gly Asn Thr Glu Ala
        440                 445                 450

tgc aca ctg acc gca cct gcg gca ggc acg tat tac gtg cga ctg aaa    2407
Cys Thr Leu Thr Ala Pro Ala Ala Gly Thr Tyr Tyr Val Arg Leu Lys
    455                 460                 465

gga acg ctg gcg ttc tcc gcg gtc aac ctg gtg gcg acg tac tga        2452
Gly Thr Leu Ala Phe Ser Ala Val Asn Leu Val Ala Thr Tyr
470                 475                 480

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cagcgcgttt ctatgtatgg cggacgcaag gctggcttac ctgcgctatt tcgggcgtgg  2572

caggctcact cgcagagcgg gtaagcgcgc gcgccgagga catgcacaat ctcggcgccg  2632

gccagttcca gcagcaggcc acgctggccg gcgttgatcc acaacgcagg tgcgtcgagc  2692

acgctggatt cgatcagcac cggcgtgggc cgctgctgcc cgagcgggct gatgccgccc  2752

accttgtagc cggtgcggcg ttcggcatcg gccacctcca tcatgcgcgc ggacttgccg  2812

ccgcaggcgc tggcaagggt cttcaacgac aagcggcggt cgcacgggat caccacgcag  2872

atcgcgtgct cgtccaccca ggtcatcagg gtcttgagca cctggtgcgg cggcagttgc  2932

agcgcctgcg cagcttgcag gcccttggcg tcggcatcgg cctggtactg ataaggatgc  2992

agcacatagg ccacgccggc cgcatccagt gcacgggttg cgcgggtggc cttgctcatc  3052

gcttagaccg gttcgaaccg gttggccgcc acgttcttgc gcaccgtttc cgggttccag  3112

atccttccgt tcatggcgat gtagacgccg gccggcagcg tctggacggc cccgaccgcg  3172

cagccgatgt tgaactcggc atcggagccg cgaaagcgcg ccggattgag tgcgccggtc  3232

atcacgatgg tcttgtcggc gatcgactgc agcaccttgc cggtttccac catcgaatcg  3292

gtgccgtggg tgatcagcac ctgtcgggcg ggctgcgcct ggatggtggc gcggatcagc  3352

tcgcggtctt cctgggtgat gtgcaacgaa tccttgcgga tgatcgggat gaccgtgaag  3412

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ggactttctg ctcgaacact tcggcgagac gccaccctgg gaactgccta gtgctgcaag 180

aggtggtgag tgacgccacc gcagcgtgcc atcagtatcc tgggttcaga gcacgcttca 240

gcctacgtcg gccgctgaat aacttcgcgt tgcgattgat tgtttggatc gatcacgtca 300

aaaaaatccc aatcgcaagc acatgctgtg ccgttatccg cagcagttgc gcatagaact 360

acatgtcact gcaaaaatcg ctgctgcatc acagccggcg ccgcgttctg cgatttgtcg 420

tgctgcatcg ctgcagttac atctgtgccc agtcgcttgc agatcacgcg accgcgccga 480

gccgagcatt cccaatgctc gccggctgca caggatcgcc tgcgtcgttg catgacccgg 540

gcgcatggat agataccgac cggactcgat gaagatggat atgccttcgc tcctgatgta 600

cccgtacgtg ccacgccggc cccgcgatat tgcgtggtcc gctgccgccg ttccactgcg 660

atatcgcaca caacatctgc gctgatagcc cgcattaacc gcccgagtac tccccgctcg 720

gcgcacgacg cacgacgccc ttgatgcatc acacacgacc atagcggccg tgtacgcacg 780

acgcatgcgc gccattgcga gcgcctgcat gcgctacgcc gtcgattacg gcaaatctcc 840

cgctcgcacc caaatgggac tctgttgatg acttcttttc cgcaacggca attgctgttc 900

tccgcgctcg tgctggcgct gtgtagcgcg gcatcctcgg caccgggtgt tggcgcaaac 960

cccggcaaca tcacgcgccc aacccaggcc accagaagaa agt gac ccg ctt ttc 1015
Ser Asp Pro Leu Phe
1 5

cgc tat caa tgg cat ttg ctc aac gat ggg caa gag gtc att gcc gac 1063
Arg Tyr Gln Trp His Leu Leu Asn Asp Gly Gln Glu Val Ile Ala Asp
10 15 20

act cgg cca cgc gcc gga acg gat ctg aat gtg ggc ccg ctg cat acg 1111
Thr Arg Pro Arg Ala Gly Thr Asp Leu Asn Val Gly Pro Leu His Thr
25 30 35

ttg ggg ctg cgt gga caa ggc gta acc gtc gcc gtc gtg gac gac gca 1159
Leu Gly Leu Arg Gly Gln Gly Val Thr Val Ala Val Val Asp Asp Ala

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        40                  45                  50

ctc gaa cta cgc cac ccg gat ctt gtt gcc aac gtg gtg ccc ggc ggt    1207
Leu Glu Leu Arg His Pro Asp Leu Val Ala Asn Val Val Pro Gly Gly
    55                  60                  65

tcc aag aac ttt gtc gat gga tcg aat gat cca acg cca cgc aac ggc    1255
Ser Lys Asn Phe Val Asp Gly Ser Asn Asp Pro Thr Pro Arg Asn Gly
70                  75                  80                  85

gct tcc cac ggc acg atg gtt ggc ggg atc atg gcg gca gtg ggc tgg    1303
Ala Ser His Gly Thr Met Val Gly Gly Ile Met Ala Ala Val Gly Trp
                90                  95                  100

aac ggg ctt ggt ggt cgc ggc gtt gcg ccc gat gcg cgc ctg aaa ggt    1351
Asn Gly Leu Gly Gly Arg Gly Val Ala Pro Asp Ala Arg Leu Lys Gly
            105                 110                 115

ttc aac atc ctt tcc tca gaa gaa agc ccg acc gac ttc gat acc aat    1399
Phe Asn Ile Leu Ser Ser Glu Glu Ser Pro Thr Asp Phe Asp Thr Asn
        120                 125                 130

cta cgc gcc tcc tgg ggc gat tcg gtg caa tcc cgg gat gtg gat gta    1447
Leu Arg Ala Ser Trp Gly Asp Ser Val Gln Ser Arg Asp Val Asp Val
    135                 140                 145

ttc aat aac agc ttt ggc tca gat ctg acg tac tac ccg aca atc tct    1495
Phe Asn Asn Ser Phe Gly Ser Asp Leu Thr Tyr Tyr Pro Thr Ile Ser
150                 155                 160                 165

cca gca gca gag cgc tcg ctt gac cgc ttg atg cgt cga gca aga aac    1543
Pro Ala Ala Glu Arg Ser Leu Asp Arg Leu Met Arg Arg Ala Arg Asn
                170                 175                 180

ggc aag ggg ggt ctg tat gtc cag gca gca ggg aac acg ttc gat agt    1591
Gly Lys Gly Gly Leu Tyr Val Gln Ala Ala Gly Asn Thr Phe Asp Ser
            185                 190                 195

ttt acg gtt ctc gac gac cag ggg aac tgg gtg gag cga tgc cct gtg    1639
Phe Thr Val Leu Asp Asp Gln Gly Asn Trp Val Glu Arg Cys Pro Val
        200                 205                 210

ctg gcc cgc acc ttg gga gtc act tgc tcc acg ccg gct acc gat ccg    1687
Leu Ala Arg Thr Leu Gly Val Thr Cys Ser Thr Pro Ala Thr Asp Pro
    215                 220                 225

ttg agt aac caa ccc ctg atc atc gcg acg ggc gca gtc aat gca cgc    1735
Leu Ser Asn Gln Pro Leu Ile Ile Ala Thr Gly Ala Val Asn Ala Arg
230                 235                 240                 245

ggc ctg cgc tcg tcc tac tct tca gcc ggc gcg gcg cta tgg gtc acc    1783
Gly Leu Arg Ser Ser Tyr Ser Ser Ala Gly Ala Ala Leu Trp Val Thr
                250                 255                 260

ggc ttc ggc ggg gag ttc ggg ctg caa cgc cgc tac ttt ggc gac cgg    1831
Gly Phe Gly Gly Glu Phe Gly Leu Gln Arg Arg Tyr Phe Gly Asp Arg
            265                 270                 275
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ccg cgg ccc gcg ttg ttc gat ccc gcc atc gtc acc acc gac ctg act    1879
Pro Arg Pro Ala Leu Phe Asp Pro Ala Ile Val Thr Thr Asp Leu Thr
        280                 285                 290

ggc tgc gcc gtc ggt gac aac agg gac atc gcc ggc cag ccg ccg atc    1927
Gly Cys Ala Val Gly Asp Asn Arg Asp Ile Ala Gly Gln Pro Pro Ile
    295                 300                 305

aat gca ttg gct tca agc agc tca ccg atc gac gcc tct tgc aac tac    1975
Asn Ala Leu Ala Ser Ser Ser Ser Pro Ile Asp Ala Ser Cys Asn Tyr
310                 315                 320                 325

tcc gcg gca atg aac ggc acc tcc gca gcg gca ccc acg gtt gct ggg    2023
Ser Ala Ala Met Asn Gly Thr Ser Ala Ala Ala Pro Thr Val Ala Gly
                330                 335                 340

gtg gtt gcg ctg atc gtg cag gcc aat ccg tcg ctc acc gcg cgc gac    2071
Val Val Ala Leu Ile Val Gln Ala Asn Pro Ser Leu Thr Ala Arg Asp
            345                 350                 355

ctt aag tac atc ctg gca aca agc gcg cgc cag atc gat cct gcg cag    2119
Leu Lys Tyr Ile Leu Ala Thr Ser Ala Arg Gln Ile Asp Pro Ala Gln
        360                 365                 370

cag gtg atc cgc tac caa ggc agc gtg atc gag ccg ggc tgg atc acc    2167
Gln Val Ile Arg Tyr Gln Gly Ser Val Ile Glu Pro Gly Trp Ile Thr
    375                 380                 385

aat gcg gcc ggc cat gca ttt agc aac tgg tac ggt ttc ggc ctg gtg    2215
Asn Ala Ala Gly His Ala Phe Ser Asn Trp Tyr Gly Phe Gly Leu Val
390                 395                 400                 405

gac gct gcc gaa gcg gtc tat cgc gcc tat ggg ttc cag ccg ctt ccg    2263
Asp Ala Ala Glu Ala Val Tyr Arg Ala Tyr Gly Phe Gln Pro Leu Pro
                410                 415                 420

ccc cag cgc gat ctg ggc tgg aaa gcg gca cgc gca ggc aca tcg acg    2311
Pro Gln Arg Asp Leu Gly Trp Lys Ala Ala Arg Ala Gly Thr Ser Thr
            425                 430                 435

att ggc gga cca aat gcc gcg gca acc ttg cgg ttg cgg ctc ggg gac    2359
Ile Gly Gly Pro Asn Ala Ala Ala Thr Leu Arg Leu Arg Leu Gly Asp
        440                 445                 450

acg ctc aag atc gac acc gtg cag tgg tcg atg cag acc acc cac aag    2407
Thr Leu Lys Ile Asp Thr Val Gln Trp Ser Met Gln Thr Thr His Lys
    455                 460                 465

aca ccg agc aat ctc cgg gta gtg ctg atc tcg ccg agt ggc acc cgc    2455
Thr Pro Ser Asn Leu Arg Val Val Leu Ile Ser Pro Ser Gly Thr Arg
470                 475                 480                 485

agc tac gtg ctc act ccc ttc cag gcc ttg gat acg atc acg cag ggg    2503
Ser Tyr Val Leu Thr Pro Phe Gln Ala Leu Asp Thr Ile Thr Gln Gly
                490                 495                 500
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gcc ggc ttt gag ata ccg ctt tcg acc agc aat gcc ttc cta gac gaa    2551
Ala Gly Phe Glu Ile Pro Leu Ser Thr Ser Asn Ala Phe Leu Asp Glu
            505                 510                 515

aac gtt gcc ggc acc tgg acg ctg gaa gtc acc gac atg acc ggc tcg    2599
Asn Val Ala Gly Thr Trp Thr Leu Glu Val Thr Asp Met Thr Gly Ser
        520                 525                 530

gac gtt ccc gcc caa ctg acg ggc ttc aaa ctg cgc atc ctg gga cat    2647
Asp Val Pro Ala Gln Leu Thr Gly Phe Lys Leu Arg Ile Leu Gly His
    535                 540                 545

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tgccggcctc tgcgcaagac accgaccggc tcgcattgca gcgtgccgca accgggcaag  2760

gcttcaccat cggcgatacc aacttcaggt tggtacccaa cgccagagtg ctacgcaata  2820

caacgccgcc gccccgcgca gatgtgcctg caatgcgccg tagcaccact gccgctgccg  2880

gcgtaacgct gcagcacatt ggcccgtatg tcatctccag cggcaactca ccgcgctcac  2940

cgcgtaccac gcccgtcggc gacgtggagg agccgtcgtt gatggtggca atcaatcagc  3000

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gactgacgga ggagttaacc ggcccgatca tgcgtcgccc gctgcgatct ccgtgttcgt  3360

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aggccaagga tctgctggtg cgccagttgg gtgcgccgtg cgagctcggc cgttgccgcc  3540

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caatgccggc gacctggcat cgatggtcgc cggcatgtcg cgcgggctgc tggtcaccga   180

gctgatgggc aacggcgtca acgcggtgac cggcgactat tcgcgcggtg ccggcgggtt   240

ctgggtcgag aacggcgaga tcgcctatcc ggtcgacggg ctgaccattg ccggcaacct   300

gcgcgacatg tttgccggga tcgaagcggt gggcagcgat gtcgacccgc gctcgcacgt   360

caagatcggc tcggtgctga tcaatcgcat gaccgtggcc ggcgacagct gagtcacccg   420

cccagtaact gcgcccgcca gcgtcccggc gctggcggac ccatggcttc ccgcactggt   480

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tgagcgagtt cgacacacac gccgcgccac caccgccgcc gatcagcacc ggcacgccct   600

cggaagagcg cacgttggca ctggccgcgc acctgctggg catcctgacg tccttcatcg   660

gcgcgctggt gatctggctg atcagcaagg acgccggccc gtccaagccg tttgccaccg   720

accaggccaa ggaagcgctg aacttccaga tcaccgtgat catcgcctac gtggctgcgg   780

tgatcctgac catcgtgtcg ttcggcatcc tgttcttcgt gccgacgctg gtgtgggtcg   840

ccaacctggt gctctgcatc ctggcggcgg tcaaggccaa cagcggcgag agctaccgct   900

atccgttcac gctgcgcctg atcaagtaat tcttgattac gcgtaaaaca aaggcccggc   960

agtcatgccg ggcctctggc gtttttagaa agtcacgcaa tca gtt ctg cgc cgg    1015
                                              Ser Val Leu Arg Arg
                                              1               5

ggt gtt ctc ggc aaa gta ctc gtg gct gtc ggc att ggt gat cgc ctg    1063
Gly Val Leu Gly Lys Val Leu Val Ala Val Gly Ile Gly Asp Arg Leu
               10                  15                  20

ggc cgg gtt gct gat cgc cag gct gcg tgc gcc gga ctg acc ata cac    1111
Gly Arg Val Ala Asp Arg Gln Ala Ala Cys Ala Gly Leu Thr Ile His
           25                  30                  35

gcg gtc ctg ggt gcc ggc cac cac ggt gaa gtg gct ggt ctc gtg cac    1159
Ala Val Leu Gly Ala Gly His His Gly Glu Val Ala Gly Leu Val His
       40                  45                  50

cag cgt gcc ggc ctt gga gtc ggt gcc ggt tgt cga cgc gct cca gaa    1207
Gln Arg Ala Gly Leu Gly Val Gly Ala Gly Cys Arg Arg Ala Pro Glu
   55                  60                  65

cgc gtt gca gac atg gat ctc gta cgg ctg gtt cgg ata gac gta agc    1255
Arg Val Ala Asp Met Asp Leu Val Arg Leu Val Arg Ile Asp Val Ser
70                  75                  80                  85
```

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gaa ggc gtc cgc cag atc cgc ttc gca gct gca gtt gat cgt cag ctg    1303
Glu Gly Val Arg Gln Ile Arg Phe Ala Ala Ala Val Asp Arg Gln Leu
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gcc att gtt ctg gtc cag cgc gtt gtc gat gtt gac gaa gtt gga gct    1351
Ala Ile Val Leu Val Gln Arg Val Val Asp Val Asp Glu Val Gly Ala
            105                 110                 115

gac ccg gct gta gcg cgc ggc gtt gta ggt gcc gaa cca ggt ggt gta    1399
Asp Pro Ala Val Ala Arg Gly Val Val Gly Ala Glu Pro Gly Gly Val
        120                 125                 130

gcg cgc ccc ggt gct gcc gcc gtt gag gta ggt acg cgc gtt ctg cga    1447
Ala Arg Pro Gly Ala Ala Ala Val Glu Val Gly Thr Arg Val Leu Arg
    135                 140                 145

gta att acg cgc ggc agc gac gcc act ggc ggc ctg gtt ggt gcg ggt    1495
Val Ile Thr Arg Gly Ser Asp Ala Thr Gly Gly Leu Val Gly Ala Gly
150                 155                 160                 165

ggt gct gca gtt gag ata gtt gat gcc gtt gac cac ggc ggt cgg gcc    1543
Gly Ala Ala Val Glu Ile Val Asp Ala Val Asp His Gly Gly Arg Ala
                170                 175                 180

gat tgc gag ctg gcg cta tac acc acg tcg cgc gcc atc cag cca aac    1591
Asp Cys Glu Leu Ala Leu Tyr Thr Thr Ser Arg Ala Ile Gln Pro Asn
            185                 190                 195

agt gag cgg ggt gct ggt ggc cac tgc cgg cag gcc gtt tgc ggc ctt    1639
Ser Glu Arg Gly Ala Gly Gly His Cys Arg Gln Ala Val Cys Gly Leu
        200                 205                 210

cat cgg gct gcc atc gga cag cga ggc gta ctg cag cga cga gcg cac    1687
His Arg Ala Ala Ile Gly Gln Arg Gly Val Leu Gln Arg Arg Ala His
    215                 220                 225

ctg gat ggt gta gtt gcc gct ggt gga cag gtc ata ggc gcc ggc cag    1735
Leu Asp Gly Val Val Ala Ala Gly Gly Gln Val Ile Gly Ala Gly Gln
230                 235                 240                 245

atc cac ctc gcc ctg gac gct ctg gcc cgg ctg cag gat ggt gaa gtc    1783
Ile His Leu Ala Leu Asp Ala Leu Ala Arg Leu Gln Asp Gly Glu Val
                250                 255                 260

ggc tgc ctt ggg cag gcc gcg ctt gac cag gcg ccc ggt gta gtc cac    1831
Gly Cys Leu Gly Gln Ala Ala Leu Asp Gln Ala Pro Gly Val Val His
            265                 270                 275

cgg ctt gcc gtc gcg gct cac ctc cag gat gcc gtt gtc cag cga ctt    1879
Arg Leu Ala Val Ala Ala His Leu Gln Asp Ala Val Val Gln Arg Leu
        280                 285                 290

cag cgg cag ctg ata ggt cgg aac gcg ggc aac ctg gct acc gtt gtt    1927
Gln Arg Gln Leu Ile Gly Arg Asn Ala Gly Asn Leu Ala Thr Val Val
    295                 300                 305

ggt gac ggt gac cgc gat ctt gcc ttg atg tcg ccc ggc ctg gtc ggc    1975
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Gly Asp Gly Asp Arg Asp Leu Ala Leu Met Ser Pro Gly Leu Val Gly
310                 315                 320                 325

cac tgg cgc cag ttc gat ggt caa cgg aac cgg tcc gcg cac gga ctg    2023
His Trp Arg Gln Phe Asp Gly Gln Arg Asn Arg Ser Ala His Gly Leu
                330                 335                 340

tgc ctg cgc cga acc gag cac gccgacgacg gccagcgtgc ctgctgcaaa       2074
Cys Leu Arg Arg Thr Glu His
            345

cgatgcaaga aaaacattct tcaccagtga ctctccttgg tcgggggatg cccgcaagcg  2134

cgggcaggcc aaacctaggc agagcgagcg aacgcgacaa gccgttcaat tagcgatatt  2194

tctggatgtg gcgcatgggt tatgcatccg gatacatcac tggtgtagat aattcagcga  2254

taaagcctgc tggcggtcac ggaattgtgg tgcctgtgtg tcgccggctg acacaaacgc  2314

tggcgaccaa tgtgccgttt tgtgaccagg cgcgcctgtt gcctgaatgg acccgcgtga  2374

tcgaccgtgc ggtggcgcac ggaatgcgca aacgtgtcgc gtaacgcgaa caccgggaag  2434

gtgatgcccg cgccagcgct gtgattgcgt tggggtctag caggggcggt gatgtgcgga  2494

gcgatgcgtc ggatgtcgcc gcgccagaca cccacgcacc atcacacgcg cttggcagcc  2554

gcgcatgagg cctggttagc cgtgcctagt gggcgcggtc gaccgcgaag cggccgaggc  2614

tggccaaggt ggcgccggat tcgccgtagg gcagcaacag cgcatgcata tggctggcca  2674

gttccgccag cttggttttg gcgccgtcca tgcccagcaa ggcggggtag gtggacttgg  2734

actgcgccgc atccttgccg gcagtcttgc cgagctgggc ggagcttgat tccacatcca  2794

ggatgtcgtc acgcacctgg aacgcgagcc ccagcgcgtc ggcaaacgca tccaggcgct  2854

gctggtcggc aatacccgcg ccgcctgtca gcacgcccat gcgcaccgcg gcgcggatca  2914

gcgcaccggt cttgagtgca tgcatgcgct gcagtgcctc cagcgcctgc acctgcccgg  2974

tggcgtcgat atccagcgcc tgcccgccac acatgccggc cgcaccggcg gcagatgcca  3034

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<221> CDS
<222> (1001)..(2788)

<400> 33

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gattaacgag gaaagctgcc ccctcggcat gcgccaagcg acttcgcgac ccccgtcgaa   180

accagtgcac ccccggggaa agcatcaaaa cgctgacgtg accagtgtag ggatcggcgc   240

gcccggtcac aagtagtgag ataggcagcg cttacagtgg cttcagttgc acagtccgga   300

actatccgga actgaaggag ctactggatg agcacaggca agcgccccac cggcccgcgc   360

acgacgcgcg ccgcaaccaa gaaggccgcc aagaccgccc cgccggccaa gcgccgttcg   420

gggcgtcagg ccgccgccaa ggcggaaacg caagaggaaa acggccatcg cacgcgggtg   480

cagggcaagg cccgcaccgt catctacatc catggcatcg gcaacaagcc accggccgag   540

gtgttgcgct gccagtggga caaggccttg ttcggccgcc cgatgggtga gcgcacgcgg   600

ctggcgtact gggtcaaccg cgagcgctac ccggtgccgg agcccggcag ttgcgatggc   660

cgcgatgtgg ggccggcgtt gaaccagagc gtgcagcggg cgttgagcac gctggggctg   720

gtgccgggcg agcaggacct gcatgcgctg gccgatgcgc tggcacagag cgagcaggag   780

cgtgctgacc tgcaccagat gctggacgag ctgcaggccg cgccactcgc cggtggcatg   840

caggcgaagg ggccgatcga tgcgatcaac cgggtgctgc tgcggctgat ttccgcggcg   900

ctgctgcagg acgtgcacga tctgttcttt gtcccggagc gggccgcgca gatgcgcgaa   960

agcctggcgc aacggttgcg cgccggtggc ggtcccgttc gtg gtg gtg gcg cac    1015
                                          Val Val Val Ala His
                                          1               5

agc cag ggc tcg atg att gcc tac gat gtg ctg cgg cag ttg cag gcc    1063
Ser Gln Gly Ser Met Ile Ala Tyr Asp Val Leu Arg Gln Leu Gln Ala
               10                  15                  20

gat ggc tgc gag gtg gcg ctg ttt ctg acc ctg ggc tcg ccg ctg ggc    1111
Asp Gly Cys Glu Val Ala Leu Phe Leu Thr Leu Gly Ser Pro Leu Gly
            25                  30                  35

ttg ccg cag gtg cgc agc atg ttc aag cgc tgg acc ggg acg cgc aaa    1159
Leu Pro Gln Val Arg Ser Met Phe Lys Arg Trp Thr Gly Thr Arg Lys
        40                  45                  50

ctg ccg ttc ccc gac tgc gtg cgg cgc tgg gtc aac gtg gcc gaa acg    1207
Leu Pro Phe Pro Asp Cys Val Arg Arg Trp Val Asn Val Ala Glu Thr
    55                  60                  65

cgc gat ccg atc gcg ctg gat cca gac ctg acc gac gac ata gcc aat    1255
Arg Asp Pro Ile Ala Leu Asp Pro Asp Leu Thr Asp Asp Ile Ala Asn
70                  75                  80                  85

gcc aaa ggg cgg ttc gaa aac atc gcc gcc gcg cgg ctc aac ccg gac    1303
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Ala Lys Gly Arg Phe Glu Asn Ile Ala Ala Ala Arg Leu Asn Pro Asp
                90                  95                  100

tgg gag cac aac ccg cat tcg ggc tcg gga tat ttg gcc att gcg cag    1351
Trp Glu His Asn Pro His Ser Gly Ser Gly Tyr Leu Ala Ile Ala Gln
            105                 110                 115

gtg cgt gca gcg gtg cgg cag gcg gtg ggt gtg ggc ttc gat cag ccg    1399
Val Arg Ala Ala Val Arg Gln Ala Val Gly Val Gly Phe Asp Gln Pro
        120                 125                 130

gtc tcc aat gcg gtg ctg atc aag gac ctc agt gag cag ctc gaa gcg    1447
Val Ser Asn Ala Val Leu Ile Lys Asp Leu Ser Glu Gln Leu Glu Ala
    135                 140                 145

cac ggc gcg gac tat cgg cac gag gtg ttg atc gaa ctg gac cgt cgc    1495
His Gly Ala Asp Tyr Arg His Glu Val Leu Ile Glu Leu Asp Arg Arg
150                 155                 160                 165

gtc ctg ggt gcg gac ccg gcc ggc gtg cgt gcg cag ttg atc acc cac    1543
Val Leu Gly Ala Asp Pro Ala Gly Val Arg Ala Gln Leu Ile Thr His
                170                 175                 180

atg cgc cag att gcc ggg cat agc acc ggc ctg gac ggc gat gca ttg    1591
Met Arg Gln Ile Ala Gly His Ser Thr Gly Leu Asp Gly Asp Ala Leu
            185                 190                 195

gac gag gcg atc gaa ctc gaa gac agc ctg cag cgc ctc att tcg gcg    1639
Asp Glu Ala Ile Glu Leu Glu Asp Ser Leu Gln Arg Leu Ile Ser Ala
        200                 205                 210

cgg ctg acg cgg ttc gag atc gaa acg ctg caa agc cgc tac cgc gca    1687
Arg Leu Thr Arg Phe Glu Ile Glu Thr Leu Gln Ser Arg Tyr Arg Ala
    215                 220                 225

ctg ggt ttc cgg cgc gtc tgg cgc gat gcc ggc aag cgg gcg ctg atc    1735
Leu Gly Phe Arg Arg Val Trp Arg Asp Ala Gly Lys Arg Ala Leu Ile
230                 235                 240                 245

cac gtc tcg ggc aac gtg ctg cat gtg gat gca gca cgc acg gcg tat    1783
His Val Ser Gly Asn Val Leu His Val Asp Ala Ala Arg Thr Ala Tyr
                250                 255                 260

cgc gca cgt ggg cag cag atc ggc tgg gcg gtc ctg gat acc ggc att    1831
Arg Ala Arg Gly Gln Gln Ile Gly Trp Ala Val Leu Asp Thr Gly Ile
            265                 270                 275

gcg gcc gcg cat ccg cat ttc ttc gtg ccg ggc gag cgc gac aat gtg    1879
Ala Ala Ala His Pro His Phe Phe Val Pro Gly Glu Arg Asp Asn Val
        280                 285                 290

gtg gcg caa tgg gat tgc acg cgg cgc ggc gcg ccc aag cgg ctg acg    1927
Val Ala Gln Trp Asp Cys Thr Arg Arg Gly Ala Pro Lys Arg Leu Thr
    295                 300                 305

cgg gcc gat ggc aaa cgg ttc acc gca ctc gac ggg cac ggc cat ggc    1975
Arg Ala Asp Gly Lys Arg Phe Thr Ala Leu Asp Gly His Gly His Gly
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310                 315                 320                 325

acg cac atc gcc ggc atc atc gcc ggc tgt tgc cgg gcg gcg gtg cct    2023
Thr His Ile Ala Gly Ile Ile Ala Gly Cys Cys Arg Ala Ala Val Pro
                330                 335                 340

gat gcc agt ggc aag ccg ggc gaa ctg ctg gaa ttt gcc ggc atg gcg    2071
Asp Ala Ser Gly Lys Pro Gly Glu Leu Leu Glu Phe Ala Gly Met Ala
            345                 350                 355

ccg gag acg caa ctc tat ggc ttc aag gtg ctg gac gac gcc ggc aac    2119
Pro Glu Thr Gln Leu Tyr Gly Phe Lys Val Leu Asp Asp Ala Gly Asn
        360                 365                 370

ggg cgc gat tcg tgg atg atc aag gca gtg cag cac gtg gcc gat ctc    2167
Gly Arg Asp Ser Trp Met Ile Lys Ala Val Gln His Val Ala Asp Leu
    375                 380                 385

aac gag cgt gcc ggc gag ctg gtg atc cac ggc gtc aat ctc agc ctg    2215
Asn Glu Arg Ala Gly Glu Leu Val Ile His Gly Val Asn Leu Ser Leu
390                 395                 400                 405

ggc ggg tac ttc gat ccg gaa agc tac ggc tgt ggc ttc acg ccg tta    2263
Gly Gly Tyr Phe Asp Pro Glu Ser Tyr Gly Cys Gly Phe Thr Pro Leu
                410                 415                 420

tgc aac gag ttg cgg cgg tta tgg cgg cag ggc gta ctg gta gtg gtg    2311
Cys Asn Glu Leu Arg Arg Leu Trp Arg Gln Gly Val Leu Val Val Val
            425                 430                 435

gcg gcc ggc aac gaa ggc ctg gcc tgg ctg atg cag aac gac ggc ggc    2359
Ala Ala Gly Asn Glu Gly Leu Ala Trp Leu Met Gln Asn Asp Gly Gly
        440                 445                 450

acc tat ccg gcg aac atg gat ctg tcg atc agc gat ccg ggc aat ctg    2407
Thr Tyr Pro Ala Asn Met Asp Leu Ser Ile Ser Asp Pro Gly Asn Leu
    455                 460                 465

gag gac gcg atc gtg gtg gga tcg gtg cac aag agc agc ccg cac aat    2455
Glu Asp Ala Ile Val Val Gly Ser Val His Lys Ser Ser Pro His Asn
470                 475                 480                 485

tac ggc gtg tcg tat ttt tca tcc cgc ggg ccg acc gcc gat ggc cgc    2503
Tyr Gly Val Ser Tyr Phe Ser Ser Arg Gly Pro Thr Ala Asp Gly Arg
                490                 495                 500

tcc aaa cct gat gtg gtc gcc ccg ggc gaa aag atc ctg tcc gct tac    2551
Ser Lys Pro Asp Val Val Ala Pro Gly Glu Lys Ile Leu Ser Ala Tyr
            505                 510                 515

tac ggc ttc gac ccg cgc gac ccg tcc agc ctg atg gtc gag atg agc    2599
Tyr Gly Phe Asp Pro Arg Asp Pro Ser Ser Leu Met Val Glu Met Ser
        520                 525                 530

ggc acc agc atg gcc gca ccg cat gtg tcc ggc gtg ctg gcc ggg ttt    2647
Gly Thr Ser Met Ala Ala Pro His Val Ser Gly Val Leu Ala Gly Phe
    535                 540                 545
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tta tcc gca cgc cgc gag ttc atc ggc ttt ccg gac cgg gtc aag caa    2695
Leu Ser Ala Arg Arg Glu Phe Ile Gly Phe Pro Asp Arg Val Lys Gln
550                 555                 560                 565

ctg ctg ctg gac acc tgc acc gac ctg cag cgc gat cgt tac gtg cag    2743
Leu Leu Leu Asp Thr Cys Thr Asp Leu Gln Arg Asp Arg Tyr Val Gln
                570                 575                 580

ggc agg ggg gtg ccg aat ttg atg cgg atg ctt gga gag acg tga        2788
Gly Arg Gly Val Pro Asn Leu Met Arg Met Leu Gly Glu Thr
            585                 590                 595

ttcgggagtc gggatttggg attcgcaaac gcggtggttg gctgaacaaa aacggccgcg  2848

atgcaggttg cagcccgaat gctggctaag agcggtcgcg tcacatggcg tggcgggatc  2908

gcacggcctc aaagcagccc aaaccatcgc aacttgcggt ctcagcaaat gctcagctca  2968

agcagccccg ttcttgcgaa tcccgaatcc caaatcccgg cgactcacgc atcccgatta  3028

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atgtgcttga agaggacgac gcccacatcg tggcgcggct ggacctgggg ctcggttcgt  3748

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acgccgctgt ggccaaccac atcaccggca ccgcgattgg tggcagcgcg tatgcgcacg 180

gccccaacga caccgcgatt ggcagcaatg cacgcgtcaa tgccgatggc agcaccgcag 240

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ccagcgtggc cggtattgcc tcgcaaaacc gcctcggtgc cggtgtcggt ttccagaacg 720

gcgagtcggc gttgtcggtg ggttatcagc gggcaatcag cccgcgcgcc acggtgacca 780

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actgacgcct gatccacgaa aaactgaaga ggacttcacc gtg atc gac aag aat 1015
Val Ile Asp Lys Asn
1 5

ttc cgt ctc aac ccg ctg act ggc gcc atc ttg atg atg gcc ctg ggt 1063
Phe Arg Leu Asn Pro Leu Thr Gly Ala Ile Leu Met Met Ala Leu Gly
10 15 20

gct tcg ggc acc ctc gtt gct gcc ccc gcg ttg cag gtc aag gaa ccg 1111
Ala Ser Gly Thr Leu Val Ala Ala Pro Ala Leu Gln Val Lys Glu Pro
25 30 35

acc caa gcc gcg ccg gcc gcc agc gat ttc agc agc cgg ttg atc gtg 1159
Thr Gln Ala Ala Pro Ala Ala Ser Asp Phe Ser Ser Arg Leu Ile Val
40 45 50

cgt tac aag gac ggc acg gcc gcc gcg agc gat cgc agc agc aag ctg 1207
Arg Tyr Lys Asp Gly Thr Ala Ala Ala Ser Asp Arg Ser Ser Lys Leu
55 60 65

ggc gtg gtg caa tcg gcc gtg ggc cgt gcc gca ccg gtg acc ggt gcg 1255
Gly Val Val Gln Ser Ala Val Gly Arg Ala Ala Pro Val Thr Gly Ala
70 75 80 85

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cgt gct ggc gcc acc gcc gcc aag gcg acc tac ctg cgc aag ctg ggc    1303
Arg Ala Gly Ala Thr Ala Ala Lys Ala Thr Tyr Leu Arg Lys Leu Gly
                90                  95                  100

att ggc tcg gac ctg atc aaa ctg tcc ggc acg ctg acc gcc gca cag    1351
Ile Gly Ser Asp Leu Ile Lys Leu Ser Gly Thr Leu Thr Ala Ala Gln
            105                 110                 115

gtg gac aag gtg gtg gtc gag ctg aag aac gac ccg tcc gtg gcc gag    1399
Val Asp Lys Val Val Val Glu Leu Lys Asn Asp Pro Ser Val Ala Glu
        120                 125                 130

gtg cag atc gac cgc atg ctg cgt ccg gtc gag atc aag aag agc gtt    1447
Val Gln Ile Asp Arg Met Leu Arg Pro Val Glu Ile Lys Lys Ser Val
    135                 140                 145

gcg gcg acc gac gtg agc ccg cag ctg gtc ccc aac gac ccg ctg tat    1495
Ala Ala Thr Asp Val Ser Pro Gln Leu Val Pro Asn Asp Pro Leu Tyr
150                 155                 160                 165

gcg cag tac cag tgg cac ctg agc aac ccc aac ggc ggc atc aac gcg    1543
Ala Gln Tyr Gln Trp His Leu Ser Asn Pro Asn Gly Gly Ile Asn Ala
                170                 175                 180

ccg gcc gca tgg gac ctc tcg caa ggt gcc ggc gtg gtg gtg gcg gtg    1591
Pro Ala Ala Trp Asp Leu Ser Gln Gly Ala Gly Val Val Val Ala Val
            185                 190                 195

ctg gat acc ggc atc ctg ccg ggc cat ccg gac ttc gcc ggc aac ctg    1639
Leu Asp Thr Gly Ile Leu Pro Gly His Pro Asp Phe Ala Gly Asn Leu
        200                 205                 210

ttg cag ggc tat gac ttc atc acc gac gcc gaa gtc tcg cgt cgc ccc    1687
Leu Gln Gly Tyr Asp Phe Ile Thr Asp Ala Glu Val Ser Arg Arg Pro
    215                 220                 225

acc gac gcc cgc gtc ccg ggc gcg ctg gac tac ggt gac tgg gaa gag    1735
Thr Asp Ala Arg Val Pro Gly Ala Leu Asp Tyr Gly Asp Trp Glu Glu
230                 235                 240                 245

gcc gat aac gtc tgc tac gac ggg tcg gtc gcc cag gaa agc tcc tgg    1783
Ala Asp Asn Val Cys Tyr Asp Gly Ser Val Ala Gln Glu Ser Ser Trp
                250                 255                 260

cac ggc acc cat gtc tcg ggc acc gtg gcc gag gca acc aat aac ggt    1831
His Gly Thr His Val Ser Gly Thr Val Ala Glu Ala Thr Asn Asn Gly
            265                 270                 275

ttg ggc atg gcg ggc gtg gcg ccg aag gcc acc atc ctg ccg gtg cgc    1879
Leu Gly Met Ala Gly Val Ala Pro Lys Ala Thr Ile Leu Pro Val Arg
        280                 285                 290

gtg ctc ggc cgc tgc ggc ggc tac acc tcc gac atc gcc gat gcg atc    1927
Val Leu Gly Arg Cys Gly Gly Tyr Thr Ser Asp Ile Ala Asp Ala Ile
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gtg tgg gcc tcc ggc ggt acg gtc gat ggc gtc ccc gcc aac acc aac    1975
Val Trp Ala Ser Gly Gly Thr Val Asp Gly Val Pro Ala Asn Thr Asn
310                 315                 320                 325

ccg gcc gaa gtg atc aac atg agc ctg ggc ggc ggc gag ccc tgc gat    2023
Pro Ala Glu Val Ile Asn Met Ser Leu Gly Gly Gly Glu Pro Cys Asp
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ccg gcc acc cag gtc gcg atc aac ggc gcg gtg tcg cgc ggc acc acc    2071
Pro Ala Thr Gln Val Ala Ile Asn Gly Ala Val Ser Arg Gly Thr Thr
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gtg gtg gtg gcg gcc ggc aac agc ggc gaa gat gcg gcc aac cat tca    2119
Val Val Val Ala Ala Gly Asn Ser Gly Glu Asp Ala Ala Asn His Ser
        360                 365                 370

ccg gcg agc tgc aac aac acc atc acc gtc ggc gcc acc cgc atc acc    2167
Pro Ala Ser Cys Asn Asn Thr Ile Thr Val Gly Ala Thr Arg Ile Thr
    375                 380                 385

ggc ggc atc acc tac tac tcc aac tac ggc agc aag gtg gac ctg tcc    2215
Gly Gly Ile Thr Tyr Tyr Ser Asn Tyr Gly Ser Lys Val Asp Leu Ser
390                 395                 400                 405

ggt ccc ggc ggc ggc ggc agc gtg gac ggc aac ccg ggt ggt tac atc    2263
Gly Pro Gly Gly Gly Gly Ser Val Asp Gly Asn Pro Gly Gly Tyr Ile
                410                 415                 420

tgg cag gcc ggc tac gac ggc gcc acc acc cca acc tcc ggt agc tat    2311
Trp Gln Ala Gly Tyr Asp Gly Ala Thr Thr Pro Thr Ser Gly Ser Tyr
            425                 430                 435

agc tac atg ggt atg ggc ggc acc tcg atg gcg tcc ccg cac gtg gcc    2359
Ser Tyr Met Gly Met Gly Gly Thr Ser Met Ala Ser Pro His Val Ala
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ggc gtc gtg gcc ctg gtg cag agc gcg tcg atc ggc ctg ggc gat ggc    2407
Gly Val Val Ala Leu Val Gln Ser Ala Ser Ile Gly Leu Gly Asp Gly
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ccg ctg acc ccg gcg gcg atg gaa gcc ctg ctc aag cag gcc agc cgc    2455
Pro Leu Thr Pro Ala Ala Met Glu Ala Leu Leu Lys Gln Ala Ser Arg
470                 475                 480                 485

cgc ttc ccg gtg acc ccg ccg acc agc acc ccg atc ggc agc ggc atc    2503
Arg Phe Pro Val Thr Pro Pro Thr Ser Thr Pro Ile Gly Ser Gly Ile
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Val Asp Ala Lys Ala Ala Leu Glu Ala Val Leu Val Glu Pro Cys Asp
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ccg gac acc gag acc tgc gcg ccg gcc gcc att gcc ctg acc aac aag    2599
Pro Asp Thr Glu Thr Cys Ala Pro Ala Ala Ile Ala Leu Thr Asn Lys
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gcg ccg ctg acc ggc ctg agc ggt gag tac aac agc tcc acg ttg tac    2647
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Ser Phe Glu Ala Lys Ala Gly Ala Val Leu Ser Phe Met Thr Tyr Gly
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ggc acc ggt aac gtg tcg gtc tac gtg agc ttc gaa gcc gag ccc acc    2743
Gly Thr Gly Asn Val Ser Val Tyr Val Ser Phe Glu Ala Glu Pro Thr
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gca acc gat tac gac gcc aag tcc acc cgt ccg ggc aac agc gaa acg    2791
Ala Thr Asp Tyr Asp Ala Lys Ser Thr Arg Pro Gly Asn Ser Glu Thr
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gtg cgc ttc acc gca ccc aag gct ggt acc tac tac atc aag ctg gtg    2839
Val Arg Phe Thr Ala Pro Lys Ala Gly Thr Tyr Tyr Ile Lys Leu Val
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Gly Ala Gly Asp Tyr Ala Lys Leu Thr Leu Val Ala Arg Gln
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cggccaagct caccgccgcg gtgatcagcc gcatcaagat catggccaag ctcaatatcg  3784

ccgagcgccg cctgccgcag gacggccgca tcatgctgcg cgtgcagggc aaggagctgg  3844

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ccggatcaag gcctgtttct ggttctcatc gagcacgcgt ggcctggtgc tgagcatgca 180

caaggtgccg taggcatagc cctcgcggcc gatcagcggc acgcccacat aggagcggat 240

gcccggcgcg gcggtcacca acgggttgtg cgtgaaccgt gggtcggcga gggcatcggg 300

cacttccagc aggtcggtgc ccatcaccgt gtacgagcag aacgacacgc tgcgcggcgt 360

gccttccaga tcggtgccgc agcgcgcctt gaaccactgg cggtcggcat cgagcaggga 420

aatcagcgcc atcggcgaac cgctgatatg cgcggccagc caggcgaggt cgtcgaattc 480

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ggatgacggt gggtcgcccc aggtaacggc aaggcgacgg gcaacttgag ccggcgcggc 660

cggggccgct tggagcagct atcaaaacga ctgcgcagcc gccaggcggg cgcggccggt 720

gctcggaatc ggcatgtacc cccgtacact ccggttcctc cgcgccgtcc gcacccacct 780

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ccaggcatcc ggccagcccg ccctcccctg accaccggca tttgcgacgc cgccaagcag 960

ccactaccct cggccgattg tcctgccccc ggagtgtcac atg ctg cgt ccg ttg 1015
Met Leu Arg Pro Leu
1 5

tcc ttg ttg atc gcc ggc gtg ctc ggc gtt gct gcc ggt acc gtt gcg 1063
Ser Leu Leu Ile Ala Gly Val Leu Gly Val Ala Ala Gly Thr Val Ala
10 15 20

ccc gcc gca cag gcc gcc ccg gcc agc ctg tcc aag act gcg aac agc 1111
Pro Ala Ala Gln Ala Ala Pro Ala Ser Leu Ser Lys Thr Ala Asn Ser
25 30 35

agc gcc att ccc gac atc gcc tac acc cgt ttc acc ctg ccc aac ggc 1159

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Ser Ala Ile Pro Asp Ile Ala Tyr Thr Arg Phe Thr Leu Pro Asn Gly
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ctg acc gtg gtg gtg cac gaa gac cac aag gcg ccg gtg gtg gcg gtg    1207
Leu Thr Val Val Val His Glu Asp His Lys Ala Pro Val Val Ala Val
    55                  60                  65

agc atc tgg tac cac atc ggt tcc ggc gac gag ccg gcc ggc aag acc    1255
Ser Ile Trp Tyr His Ile Gly Ser Gly Asp Glu Pro Ala Gly Lys Thr
70                  75                  80                  85

ggc ttc gcg cat ctg ttc gag cac ctc atg ttc tcc ggc tcg gaa aac    1303
Gly Phe Ala His Leu Phe Glu His Leu Met Phe Ser Gly Ser Glu Asn
                90                  95                  100

aac aag ggc agc ttc ttc gcg ccg ctg gaa aag gtc ggc acc acc gac    1351
Asn Lys Gly Ser Phe Phe Ala Pro Leu Glu Lys Val Gly Thr Thr Asp
            105                 110                 115

atg aac ggc acc acc tgg ttc gac cgc acc aat tac ttc gaa acc gtg    1399
Met Asn Gly Thr Thr Trp Phe Asp Arg Thr Asn Tyr Phe Glu Thr Val
        120                 125                 130

ccg acc acc gca ctg gat acc gcg ctg tgg ctg gaa tcg gac cgc atg    1447
Pro Thr Thr Ala Leu Asp Thr Ala Leu Trp Leu Glu Ser Asp Arg Met
    135                 140                 145

ggc cac ctg ctc ggc gcc atc ggc cag gaa gaa ctc gac acc cag cgc    1495
Gly His Leu Leu Gly Ala Ile Gly Gln Glu Glu Leu Asp Thr Gln Arg
150                 155                 160                 165

ggc gtg gtg cag aac gaa aag cgc cag ggc gaa aac cgc ccc tat ggc    1543
Gly Val Val Gln Asn Glu Lys Arg Gln Gly Glu Asn Arg Pro Tyr Gly
                170                 175                 180

cgc gtg gac cag aac atc ctg tcc aac ctg ttt ccg gcc aac cat cct    1591
Arg Val Asp Gln Asn Ile Leu Ser Asn Leu Phe Pro Ala Asn His Pro
            185                 190                 195

tac cag cac gac acc atc ggc tcg atg gaa gac ctg gac gcg gcc tcg    1639
Tyr Gln His Asp Thr Ile Gly Ser Met Glu Asp Leu Asp Ala Ala Ser
        200                 205                 210

ctg gcg gat gtc aaa cag tgg ttc aac gat aac tac ggc gcg gcc aat    1687
Leu Ala Asp Val Lys Gln Trp Phe Asn Asp Asn Tyr Gly Ala Ala Asn
    215                 220                 225

acc acc ctg gtg ctg gcc ggc gac atc acc gtg gcg cag gcc cgc gcc    1735
Thr Thr Leu Val Leu Ala Gly Asp Ile Thr Val Ala Gln Ala Arg Ala
230                 235                 240                 245

aag gcc gag cag tac ttt ggc gat atc ccg tcc ggc aag ccg gtg gcg    1783
Lys Ala Glu Gln Tyr Phe Gly Asp Ile Pro Ser Gly Lys Pro Val Ala
                250                 255                 260

cgt cag cag ccg tgg gtg acc ccg ctg gcc gca cag aag cgc ggc gtg    1831
Arg Gln Gln Pro Trp Val Thr Pro Leu Ala Ala Gln Lys Arg Gly Val
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cag cac gac cat gtg tcg cag ccg cgc atc tac cgc acc tgg gcc gcg    1879
Gln His Asp His Val Ser Gln Pro Arg Ile Tyr Arg Thr Trp Ala Ala
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ccg cag ttg ggc acc gac gac atg atc cag ctg gat ctg gcc acc acc    1927
Pro Gln Leu Gly Thr Asp Asp Met Ile Gln Leu Asp Leu Ala Thr Thr
    295                 300                 305

gtg ctg ggc ggc ggc aag acc tcg cgg ctg tac cag cgc ctg gtc tat    1975
Val Leu Gly Gly Gly Lys Thr Ser Arg Leu Tyr Gln Arg Leu Val Tyr
310                 315                 320                 325

cag gac cag ctg gtg gac gat gtt tcc gcg tcg atc cag ccg ttc gcg    2023
Gln Asp Gln Leu Val Asp Asp Val Ser Ala Ser Ile Gln Pro Phe Ala
                330                 335                 340

ctg gcc agc cag atg cag atc cag gcc gac gtg aaa gat ggt gtg gac    2071
Leu Ala Ser Gln Met Gln Ile Gln Ala Asp Val Lys Asp Gly Val Asp
            345                 350                 355

ccg gcc aag gtc gag gcc atc atc gat gaa gag ctg aag aag ttc ctc    2119
Pro Ala Lys Val Glu Ala Ile Ile Asp Glu Glu Leu Lys Lys Phe Leu
        360                 365                 370

gcc gaa ggc ccc act gcc gac gaa ctg caa cgc gcc cag gtg gcc tac    2167
Ala Glu Gly Pro Thr Ala Asp Glu Leu Gln Arg Ala Gln Val Ala Tyr
    375                 380                 385

cgc gcc ggc ttc gtg cgc ggg ctg gag aag gtg ggc ggt ttc ggt ggc    2215
Arg Ala Gly Phe Val Arg Gly Leu Glu Lys Val Gly Gly Phe Gly Gly
390                 395                 400                 405

aag gcg gtg atc ctg gcc gag ggc cag gtc tat cgt ggc gac ccg ggt    2263
Lys Ala Val Ile Leu Ala Glu Gly Gln Val Tyr Arg Gly Asp Pro Gly
                410                 415                 420

gcc tac aag cag gac ctg cag cgc ggc cag gcc gcc acc atc ggc agc    2311
Ala Tyr Lys Gln Asp Leu Gln Arg Gly Gln Ala Ala Thr Ile Gly Ser
            425                 430                 435

gtc aag cag gcc gca tcg acc tgg ttc ggc aag ggc gac tac ctg ctc    2359
Val Lys Gln Ala Ala Ser Thr Trp Phe Gly Lys Gly Asp Tyr Leu Leu
        440                 445                 450

acc gta ctg ccg gcc ggc aag gac ttc gac ccc gcc gcc gaa gac aag    2407
Thr Val Leu Pro Ala Gly Lys Asp Phe Asp Pro Ala Ala Glu Asp Lys
    455                 460                 465

gcg gtg gtc gcg cgc ggc acc gag ccg ggc aag ccc gcg ccc aag ttg    2455
Ala Val Val Ala Arg Gly Thr Glu Pro Gly Lys Pro Ala Pro Lys Leu
470                 475                 480                 485

ccg gcg gcg gcc aag tac aaa gtc acc gcc agc aag ctc gat cgc agc    2503
Pro Ala Ala Ala Lys Tyr Lys Val Thr Ala Ser Lys Leu Asp Arg Ser
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aag ggc gtg ccc gac acc gcc agc ttc ccg gac ctg agc ttc ccg cag    2551
Lys Gly Val Pro Asp Thr Ala Ser Phe Pro Asp Leu Ser Phe Pro Gln
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ctg cag cgc ggc aag ctg aag aac ggc gtg gaa gtg atc ctg gcc gaa    2599
Leu Gln Arg Gly Lys Leu Lys Asn Gly Val Glu Val Ile Leu Ala Glu
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cgt cac acc atc ccg gtc acc cag gtg gag ctg ttg ttc gac gcc ggc    2647
Arg His Thr Ile Pro Val Thr Gln Val Glu Leu Leu Phe Asp Ala Gly
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tac gcc gcc gac cag ggc aag aag ctt ggc acc gcc agc ttc agc gcc    2695
Tyr Ala Ala Asp Gln Gly Lys Lys Leu Gly Thr Ala Ser Phe Ser Ala
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gcg ctg atg aac gag agc acc gcg tcg ctg gat tcg gtg gaa gtg gcg    2743
Ala Leu Met Asn Glu Ser Thr Ala Ser Leu Asp Ser Val Glu Val Ala
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cag cgc cgc cag cgc ctg ggc gcc atc acc gag gtg ggc tgc gat ctg    2791
Gln Arg Arg Gln Arg Leu Gly Ala Ile Thr Glu Val Gly Cys Asp Leu
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gac agc tgc agc gcc tcg ctg aat gcc ctc aac gac cag ctg cag ccg    2839
Asp Ser Cys Ser Ala Ser Leu Asn Ala Leu Asn Asp Gln Leu Gln Pro
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tcg ctg caa ttg ttc tcc gac atc gtg cgc aac ccg gcc ttc aag gcg    2887
Ser Leu Gln Leu Phe Ser Asp Ile Val Arg Asn Pro Ala Phe Lys Ala
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gcg gac atc gaa cgc atc cgt ggc cag tgg ctg gcc ggg atc gcg cag    2935
Ala Asp Ile Glu Arg Ile Arg Gly Gln Trp Leu Ala Gly Ile Ala Gln
630                 635                 640                 645

gaa aag acc cag ccc aac agt ctg ggc ctg cgg gcg ctg ccg ccg ctc    2983
Glu Lys Thr Gln Pro Asn Ser Leu Gly Leu Arg Ala Leu Pro Pro Leu
                650                 655                 660

atg tac ggc gac aag cat ccg tac ggc atc ccg ctt acc ggc agc ggc    3031
Met Tyr Gly Asp Lys His Pro Tyr Gly Ile Pro Leu Thr Gly Ser Gly
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acc gag gcg gca atc aag agc ctc aat gcc aag gac ctg cag gcc ttc    3079
Thr Glu Ala Ala Ile Lys Ser Leu Asn Ala Lys Asp Leu Gln Ala Phe
        680                 685                 690

cac aac cag tgg ctg cgt ccg gac aac ctg cgc atc ctg gtg gcc ggc    3127
His Asn Gln Trp Leu Arg Pro Asp Asn Leu Arg Ile Leu Val Ala Gly
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gat acc acg ctg gcg cag atc atc ccg cag ctg gat gcc gcc ttc ggc    3175
Asp Thr Thr Leu Ala Gln Ile Ile Pro Gln Leu Asp Ala Ala Phe Gly
710                 715                 720                 725
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gac tgg acg gcc ccg gcc gca ccg ttg ccg aag aag aac ctg gtc aac    3223
Asp Trp Thr Ala Pro Ala Ala Pro Leu Pro Lys Lys Asn Leu Val Asn
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gtg gcc gcg cag ccc aag ccg cgc gtt tac ctg atc aac cgc ccg gac    3271
Val Ala Ala Gln Pro Lys Pro Arg Val Tyr Leu Ile Asn Arg Pro Asp
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gcc ccg caa tcg gtc att ctg gcc ggc ctg ttg gca ccg tcg acc aag    3319
Ala Pro Gln Ser Val Ile Leu Ala Gly Leu Leu Ala Pro Ser Thr Lys
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gcg ccg gac aac ctg gca atc acg gtg gcc aat ggc gct ttc ggc ggc    3367
Ala Pro Asp Asn Leu Ala Ile Thr Val Ala Asn Gly Ala Phe Gly Gly
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acc ttc acc tcg cgc ttg aac atg aac ctg cgt gag aac aag cgc tgg    3415
Thr Phe Thr Ser Arg Leu Asn Met Asn Leu Arg Glu Asn Lys Arg Trp
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gcc tac ggt gcg cgg acc caa ctg gtg gat gcg cag ggc cag cgg ccg    3463
Ala Tyr Gly Ala Arg Thr Gln Leu Val Asp Ala Gln Gly Gln Arg Pro
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tac atg ttt gcc gcg ccg gtg cag acc gac aag acc gcc gag tcc gcc    3511
Tyr Met Phe Ala Ala Pro Val Gln Thr Asp Lys Thr Ala Glu Ser Ala
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aat gaa atc ttc aag gaa gcc acg gcc atc atc ggc gac aag ccg ctg    3559
Asn Glu Ile Phe Lys Glu Ala Thr Ala Ile Ile Gly Asp Lys Pro Leu
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acc acc gag gag atc gag aag atc aag aac cag cgc atc cgc gcc ctg    3607
Thr Thr Glu Glu Ile Glu Lys Ile Lys Asn Gln Arg Ile Arg Ala Leu
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Pro Gly Ser Phe Glu Thr Thr Gly Ala Val Leu Gly Ala Ile Glu Gly
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cgc ctg gaa gcg atc gat cag ccg gcc gcg caa gcc gcc atc aag gac    3751
Arg Leu Glu Ala Ile Asp Gln Pro Ala Ala Gln Ala Ala Ile Lys Asp
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Lys Ile Glu Ala Pro Val Arg Ala Leu Lys Leu Gly Glu Val Gln Val
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Met Ser Glu Asp Arg
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Gln Gly Arg Ser Gly Asp Ser Asn Lys Ile Leu Tyr Cys Ser Phe Cys
10 15 20

ggt aag agt cag cat gag gtc cgc aag ctg att gcc ggt ccc agc gta 1111
Gly Lys Ser Gln His Glu Val Arg Lys Leu Ile Ala Gly Pro Ser Val
25 30 35

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Phe Ile Cys Asp Glu Cys Val Glu Leu Cys Asn Asp Ile Ile Arg Glu
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cgc gag atc ctt gag gtg ctg gac cag tac gtg atc ggt cag ctg cgc 1255
Arg Glu Ile Leu Glu Val Leu Asp Gln Tyr Val Ile Gly Gln Leu Arg
70 75 80 85

gcc aag cgc acg ctc gcg gtg gcg gtg tac aac cac tac aag cgg atc 1303
Ala Lys Arg Thr Leu Ala Val Ala Val Tyr Asn His Tyr Lys Arg Ile
90 95 100

gag agc cgg agc aag aac gac gag gtc gaa ctt gcc aag tcc aac atc 1351
Glu Ser Arg Ser Lys Asn Asp Glu Val Glu Leu Ala Lys Ser Asn Ile
105 110 115

ctg ctg gtc ggc ccg acc ggc tcg ggc aag acg ctg ctg gcc gaa acg 1399

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Leu Leu Val Gly Pro Thr Gly Ser Gly Lys Thr Leu Leu Ala Glu Thr
        120                 125                 130

ctg gcg cgc ctg ctc aat gtg ccg ttc acg att gcc gat gcc acc acg    1447
Leu Ala Arg Leu Leu Asn Val Pro Phe Thr Ile Ala Asp Ala Thr Thr
    135                 140                 145

ctg acc gaa gcc ggc tat gtc ggc gag gac gtg gaa aac atc atc cag    1495
Leu Thr Glu Ala Gly Tyr Val Gly Glu Asp Val Glu Asn Ile Ile Gln
150                 155                 160                 165

aag ctg ctg cag aag tgc gac tac gac gtc gag aaa gcg cag cag ggc    1543
Lys Leu Leu Gln Lys Cys Asp Tyr Asp Val Glu Lys Ala Gln Gln Gly
                170                 175                 180

atc gtc tac atc gat gaa atc gac aag atc tcg cgc aag agc gaa aac    1591
Ile Val Tyr Ile Asp Glu Ile Asp Lys Ile Ser Arg Lys Ser Glu Asn
            185                 190                 195

ccg tcg atc acc cgc gac gtg tct ggc gaa ggc gtg cag cag gcg ttg    1639
Pro Ser Ile Thr Arg Asp Val Ser Gly Glu Gly Val Gln Gln Ala Leu
        200                 205                 210

ctg aag ctg atc gaa ggt acg gtg gct tcg gtg ccg ccg cag ggt ggg    1687
Leu Lys Leu Ile Glu Gly Thr Val Ala Ser Val Pro Pro Gln Gly Gly
    215                 220                 225

cgt aag cat ccg cag cag gaa ttc ctg cag gtc gat acc aag aac atc    1735
Arg Lys His Pro Gln Gln Glu Phe Leu Gln Val Asp Thr Lys Asn Ile
230                 235                 240                 245

ctg ttc atc tgc ggc ggc gcg ttt gcc ggg ctg gac aag gtg atc cag    1783
Leu Phe Ile Cys Gly Gly Ala Phe Ala Gly Leu Asp Lys Val Ile Gln
                250                 255                 260

gcg cgt tcc aac gat gcc ggt ggt atc ggc ttc ggc gcc aag gtc aag    1831
Ala Arg Ser Asn Asp Ala Gly Gly Ile Gly Phe Gly Ala Lys Val Lys
            265                 270                 275

agc agc gag cgc aag cag gaa gtc ggc aag atc ctg gcc gaa gtc gag    1879
Ser Ser Glu Arg Lys Gln Glu Val Gly Lys Ile Leu Ala Glu Val Glu
        280                 285                 290

ccg gaa gac ctg atc aag ttc ggc ttg atc ccc gag ttc gtc ggc cgc    1927
Pro Glu Asp Leu Ile Lys Phe Gly Leu Ile Pro Glu Phe Val Gly Arg
    295                 300                 305

ctg ccg gtg gtc gcc acg ctc gag gaa ctc gat gag ccg gcg ctg atc    1975
Leu Pro Val Val Ala Thr Leu Glu Glu Leu Asp Glu Pro Ala Leu Ile
310                 315                 320                 325

aag atc ctg acc gag ccg aag aac gcc atc acc aag cag ttc aag aag    2023
Lys Ile Leu Thr Glu Pro Lys Asn Ala Ile Thr Lys Gln Phe Lys Lys
                330                 335                 340

ctg ttc gag atg gaa agc gtg gag ctg gag ttc cgt ccg gat gca ctg    2071
Leu Phe Glu Met Glu Ser Val Glu Leu Glu Phe Arg Pro Asp Ala Leu
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                345                 350                 355

tcg gcg atc gcc aag aag gcg ctc aag cgc aag acc ggc gcg cgt ggc    2119
Ser Ala Ile Ala Lys Lys Ala Leu Lys Arg Lys Thr Gly Ala Arg Gly
        360                 365                 370

ctg cgc acc atc gtg gaa tcg gtg ctg ctg gat acg atg tac gaa ctg    2167
Leu Arg Thr Ile Val Glu Ser Val Leu Leu Asp Thr Met Tyr Glu Leu
    375                 380                 385

ccg tca cag gaa aac gtg agc aag gtg gtg gtg gat gaa tcg gtg atc    2215
Pro Ser Gln Glu Asn Val Ser Lys Val Val Val Asp Glu Ser Val Ile
390                 395                 400                 405

gaa cac aag tcc gag ccg tat ctg atc tac cag gcc cag ccg gct ccg    2263
Glu His Lys Ser Glu Pro Tyr Leu Ile Tyr Gln Ala Gln Pro Ala Pro
                410                 415                 420

gcc aag gcc gcg tct ggc gac tga ggcctcgcgg cgatgccggc aggccgtggc   2317
Ala Lys Ala Ala Ser Gly Asp
            425

ctcgctggcg gctaaagggt ttccgaccgc tacttgcaac acctcgccga tggccccata  2377

acggggccat cggctttttt tacgccccaa ttcctcgatc ccgcggagcg ccccatggcc  2437

cagtcccaac cagaaattct cgatctgcca gtgttgccgc tgcgcgacgt ggtggtgttt  2497

ccgcacatgg tgattccgct gttcgtcggc cgtgacaagt cgatgcgcgc gctggaaaaa  2557

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caaatcgaaa aaggcctgga aggcctgtcc aagggcgaag acaaggccct gagcatcgat 240

ttcccggcgg actggcgcgt gccgcagctg gctggcaaga cggtgcaggt gcacgtcaag 300

gcggtcgagg tgtccgagcc ggtgctgccg gaagtcaaca aggagttcat caagagcttc 360

ggcgtgaaga gtggcgatgc cgagcagttc cgcgccgaca tccgcaccaa tctggagcgc 420

gagctcaagg gtgcgctgat gaaccgtctg cgccgtgaag tgggcgagca actgatcgcc 480

gcctacgcgc acgtggaaat gccgccgcgc ctggtcgaga acgaagcccg ttcgatgctg 540

gcgcaacagg tcgaccagat gcgtcgcagc ggccgcaacc cgggcgagat cccggccgat 600

gcgcaccagg ggttcatgga cgccgctgcc aaacgcgtgc tggtaggcct gctggtgggc 660

gaagtcgcac gtcgcaatga gctgcgcctg gaatccaagc gtgtcagcga aacgctgcgt 720

ctgatcgcct cgacctacga ggagccggaa caggtcattg agatgtaccg caacgacccc 780

caactgatga gtgggctgca gagccgtgtg atggaggagc aggtgatcga ctggatcgcc 840

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gaccgcgtgg tacgagcccg cacccgctta gccagggtgc ggatctcaca cacgggcatc 960

ggcacaggcc gctgccacaa caggaagact gatgagcatt gtg act aaa gcc ctg 1015
Val Thr Lys Ala Leu
1 5

aac ctg gtg ccc atg gtg gtc gag cag acc agc cgt ggc gag cgt gcg 1063
Asn Leu Val Pro Met Val Val Glu Gln Thr Ser Arg Gly Glu Arg Ala
10 15 20

tat gac atc tac tcg cgt ctg ctg aag gag cgt ctg atc ttc ctg gtc 1111
Tyr Asp Ile Tyr Ser Arg Leu Leu Lys Glu Arg Leu Ile Phe Leu Val
25 30 35

ggt ccg atc gac gac cat atg gcc aac gtg atc gtg gcg cag ctg ctg 1159
Gly Pro Ile Asp Asp His Met Ala Asn Val Ile Val Ala Gln Leu Leu

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        40                  45                  50

ttc ctg gaa gcg gac aac ccg gaa aag gac atc agc atc tac atc aat    1207
Phe Leu Glu Ala Asp Asn Pro Glu Lys Asp Ile Ser Ile Tyr Ile Asn
    55                  60                  65

tcg ccc ggt ggc gtg gtc acc gcc ggc atg gcg atc tac gac acc atg    1255
Ser Pro Gly Gly Val Val Thr Ala Gly Met Ala Ile Tyr Asp Thr Met
70                  75                  80                  85

cag tac atc aag ccg gac gtg agc acg atc tgc gtg ggc cag gcg gcc    1303
Gln Tyr Ile Lys Pro Asp Val Ser Thr Ile Cys Val Gly Gln Ala Ala
                90                  95                  100

tcg atg ggc gcg ctg ctg ctg gca tcc ggt gcg gcc ggc aag cgc tat    1351
Ser Met Gly Ala Leu Leu Leu Ala Ser Gly Ala Ala Gly Lys Arg Tyr
            105                 110                 115

gcg ctg ccg aat tcg cgc gtg atg atc cat cag ccg ctg ggc ggc ttc    1399
Ala Leu Pro Asn Ser Arg Val Met Ile His Gln Pro Leu Gly Gly Phe
        120                 125                 130

cag ggc cag gcg acc gat atc gac atc cac gcc cgc gag atc ctg acc    1447
Gln Gly Gln Ala Thr Asp Ile Asp Ile His Ala Arg Glu Ile Leu Thr
    135                 140                 145

ttg cgt tcg cgc ttg aac gag atc ctc gcc aag cac acc ggc cag tcg    1495
Leu Arg Ser Arg Leu Asn Glu Ile Leu Ala Lys His Thr Gly Gln Ser
150                 155                 160                 165

ctg gag acc atc gcg cgc gac acc gaa cgc gac aac ttc aag agc gcg    1543
Leu Glu Thr Ile Ala Arg Asp Thr Glu Arg Asp Asn Phe Lys Ser Ala
                170                 175                 180

gtc gat gca cag gct tat ggc ctg gtg gat cag gtg ctg gaa cgt cgt    1591
Val Asp Ala Gln Ala Tyr Gly Leu Val Asp Gln Val Leu Glu Arg Arg
            185                 190                 195

ccg gaa gag tcg atc cag ccg tct tga gtcgcagacg cctgaaattg          1638
Pro Glu Glu Ser Ile Gln Pro Ser
        200                 205

ctggaaaaac tggcagggtc gggctggacg aatgtctccc gaccctgtgc tattctcgaa  1698

atcgaacccc cgtgcatcgg gtggggtaac tgggtaacag aagcatgagc gaagaccgcc  1758

aaggtcgttc cggcgacagc aacaagattc tctactgctc gttctgcggt aagagtcagc  1818

atgaggtccg caagctgatt gccggtccca gcgtattcat ttgcgatgag tgcgtggagc  1878

tgtgcaacga catcattcgc gaggaactcg aagagaaggc gcagtcggca cgttccagcc  1938

tgcccaagcc gcgcgagatc cttgaggtgc tggaccagta cgtgatcggt cagctgcgcg  1998

ccaagcgcac gctcgcggtg gcggtgtaca accactacaa gcggatcgag agccggagca  2058

agaacgacga ggtcgaactt gccaagtcca acatcctgct ggtcggcccg accggctcgg  2118
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tgttcatctg cggcggcgcg tttgccgggc tggacaaggt gatccaggcg cgttccaacg 2538

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caccaggcca gcctgcgaca acggcttgag gatcttgctg acggtgggcg cttccaggcc 180

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caagacaacg gtggcgtaat cggtcaattt ggtgacgcgc aacatgcgaa gacggtgaat 300

ccctaaagcg gaccgaaatt gtactctttt gctccgctca gtccaaccgc gcggttcagc 360

cgccggaaag gccagcccgt tgcggtggcc ggtgcgcttg tgcttggcgc gtgggcgcgc 420

tgcggtcaca atgagcggcc ccatcaccgg acccttttcat gtcgcgcaaa gttgccgccc 480

gcaagtcacg tatccatggc aatggcgtgt tcgccgtcgc tgcgctcagc aagggcgaac 540

gcatcatcca gtacaagggg cgcctgcgga cgcatgccga agtggatgcc gacgacaccg 600

gcgatgtgga aagcgggcac acctttctgt ttacgctgag cgatgactac gtgctcgacg 660

ccaactacga aggcaacatc gcgcgctgga tcaaccacag ctgcaatccc aattgcgaag 720

cggtgatcga agaggctgaa ggcgacgacc gcagcaagga caaggtcttc atcgaagcca 780

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agcgcgcaat caagccgggc caggagttga cctataacta cggcatcacc ctgggcgagc   840

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gcaccatgtt gcagcccaag cgctgagcaa cggcgcgcgg cggtcggcat gacgcggcgc   960

gcacatcggt tcacggatgc gcaacacgcg cattcctagg gtg cag gct cct ttg    1015
                                              Val Gln Ala Pro Leu
                                              1               5

cag att gag gag ttc ctc atg acc cat tcg ctc tcc ggc aag acc gtt    1063
Gln Ile Glu Glu Phe Leu Met Thr His Ser Leu Ser Gly Lys Thr Val
                10                  15                  20

gcc gtg ctc gcg acc agt ggc ttc gaa caa tcc gag ctg cag gag ccc    1111
Ala Val Leu Ala Thr Ser Gly Phe Glu Gln Ser Glu Leu Gln Glu Pro
            25                  30                  35

aag cgc ttg ctg gaa tcc tgg ggc gcc acc gtc gag gtg atc gcg ccc    1159
Lys Arg Leu Leu Glu Ser Trp Gly Ala Thr Val Glu Val Ile Ala Pro
        40                  45                  50

ggc gac gat gca cag atc cgt ggc tgg aac cac acc gac tgg ggc gac    1207
Gly Asp Asp Ala Gln Ile Arg Gly Trp Asn His Thr Asp Trp Gly Asp
    55                  60                  65

agc gtg ccg gtg gac acg ccc ctc gcg cag gcc aaa ccc gac cgc tac    1255
Ser Val Pro Val Asp Thr Pro Leu Ala Gln Ala Lys Pro Asp Arg Tyr
70                  75                  80                  85

gac gcg ctc gtg ctg cca ggc ggt gtg atc aac ccg gac aac ctg cgc    1303
Asp Ala Leu Val Leu Pro Gly Gly Val Ile Asn Pro Asp Asn Leu Arg
                90                  95                  100

acc aac gcg cag gcg att gac ttc atc cgc agc gtt gcg gcc agc ggc    1351
Thr Asn Ala Gln Ala Ile Asp Phe Ile Arg Ser Val Ala Ala Ser Gly
            105                 110                 115

aag ccg gtg gct gca atc tgc cac ggg ccg tgg ttg ctg gtg gaa agt    1399
Lys Pro Val Ala Ala Ile Cys His Gly Pro Trp Leu Leu Val Glu Ser
        120                 125                 130

ggg ctg gtg cgc gac cgc aag gtg acg tcg tgg ccg tcg gtc aag acc    1447
Gly Leu Val Arg Asp Arg Lys Val Thr Ser Trp Pro Ser Val Lys Thr
    135                 140                 145

gat ctg agc aac gcg ggc ggc cgc tgg gag gat gcc gag gtg gta gtg    1495
Asp Leu Ser Asn Ala Gly Gly Arg Trp Glu Asp Ala Glu Val Val Val
150                 155                 160                 165

gat ggc cag ctg atc acc agc cgc aag ccg gac gat att cct gca ttc    1543
Asp Gly Gln Leu Ile Thr Ser Arg Lys Pro Asp Asp Ile Pro Ala Phe
                170                 175                 180

acc gat gcg gtt gcc aag gca ctg gct gcc tga ggtcacgcag cagctataaa  1596
Thr Asp Ala Val Ala Lys Ala Leu Ala Ala
            185                 190
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acattgccca tcacggccgc aatggcggga tcgatcttgt agatcggctc cttgcgtgcg 1836

tagtcggcca accacgcgtt gagcaactgg cgcgtgctgc tgtccaactt ggcaccggcg 1896

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Met Phe Ser Lys Asp
1 5

cta gag caa acc atc ggc cag tgc tac aag cga gcc cgt gag gcg cgg 1063
Leu Glu Gln Thr Ile Gly Gln Cys Tyr Lys Arg Ala Arg Glu Ala Arg
10 15 20

cat gaa ttc atg acc gtc gaa cac ctg ctg ctc tcg ctg ctg gac aac 1111
His Glu Phe Met Thr Val Glu His Leu Leu Leu Ser Leu Leu Asp Asn
25 30 35

ccc tcc gcg caa gcc gtc ttg aag gcc tgc ggt gcg gac cag gtg cgt 1159
Pro Ser Ala Gln Ala Val Leu Lys Ala Cys Gly Ala Asp Gln Val Arg
40 45 50

ctg cac act gac ctg gaa cag gcg atc gag gcc tcg gtc tcg cgc ctg 1207
Leu His Thr Asp Leu Glu Gln Ala Ile Glu Ala Ser Val Ser Arg Leu
55 60 65

gcc gag gac gat ggc cgc gac acg cag ccc acc ctg ggc ttc cag cgc 1255
Ala Glu Asp Asp Gly Arg Asp Thr Gln Pro Thr Leu Gly Phe Gln Arg
70 75 80 85

gtg ctg caa cgc gcc gtc tac cac gtg cag tcc tcc ggc aag aag gag 1303
Val Leu Gln Arg Ala Val Tyr His Val Gln Ser Ser Gly Lys Lys Glu
90 95 100

gtc acc ggc gcc aat gtg ttg gtg gcg atc ttc ggc gaa aaa gac tca 1351
Val Thr Gly Ala Asn Val Leu Val Ala Ile Phe Gly Glu Lys Asp Ser
105 110 115

cat gcg gtg tac ttc ctg aat cag cag gac atc acc cgc ctg gat atc 1399
His Ala Val Tyr Phe Leu Asn Gln Gln Asp Ile Thr Arg Leu Asp Ile
120 125 130

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gtc aat tac ctc tcc cac ggc atc gcc aag ctg ggt gaa gac ggc gag    1447
Val Asn Tyr Leu Ser His Gly Ile Ala Lys Leu Gly Glu Asp Gly Glu
    135                 140                 145

cag ccg tcc gcc tcc gat ggt gag ccc aag agc gat gcg ggc gag ggc    1495
Gln Pro Ser Ala Ser Asp Gly Glu Pro Lys Ser Asp Ala Gly Glu Gly
150                 155                 160                 165

gaa ggc aag ggc gat gcc ttg gcc gag tac gcc acc aac ctg aac gat    1543
Glu Gly Lys Gly Asp Ala Leu Ala Glu Tyr Ala Thr Asn Leu Asn Asp
                170                 175                 180

cat gcc cgc aac ggc aag atc gac ccg ctc gtc ggg cgt gcg gac gag    1591
His Ala Arg Asn Gly Lys Ile Asp Pro Leu Val Gly Arg Ala Asp Glu
            185                 190                 195

atc gaa cgc acc atc cag gtc ctg tgc cgc cgc cgc aag aac aac ccg    1639
Ile Glu Arg Thr Ile Gln Val Leu Cys Arg Arg Arg Lys Asn Asn Pro
        200                 205                 210

ctg tac gtg ggc gag gcc ggc gtg ggc aag acc gcg atc gcc gaa ggc    1687
Leu Tyr Val Gly Glu Ala Gly Val Gly Lys Thr Ala Ile Ala Glu Gly
    215                 220                 225

ctg gcc aag cgc atc gtc gat gcc gac gtg ccg gaa gtg ctg gct gac    1735
Leu Ala Lys Arg Ile Val Asp Ala Asp Val Pro Glu Val Leu Ala Asp
230                 235                 240                 245

gcg gtg atc ttc tcg ctc gac ctc ggc gca ctg gtc gct ggc acc aag    1783
Ala Val Ile Phe Ser Leu Asp Leu Gly Ala Leu Val Ala Gly Thr Lys
                250                 255                 260

tac cgc ggc gac ttc gaa aag cgt ctc aag ggc gtg ctg acg gcg ctg    1831
Tyr Arg Gly Asp Phe Glu Lys Arg Leu Lys Gly Val Leu Thr Ala Leu
            265                 270                 275

aag aag gtg ccg aac gcg gtg ctg ttc atc gac gag atc cac acc atc    1879
Lys Lys Val Pro Asn Ala Val Leu Phe Ile Asp Glu Ile His Thr Ile
        280                 285                 290

atc ggt gcg ggc tcg gcg tcg ggc ggc acc atg gac gcc tcc aac ctg    1927
Ile Gly Ala Gly Ser Ala Ser Gly Gly Thr Met Asp Ala Ser Asn Leu
    295                 300                 305

atc aag ccg gcc ctg gcg tcg ggc gag ctg cgc tgc atc ggc tcg acc    1975
Ile Lys Pro Ala Leu Ala Ser Gly Glu Leu Arg Cys Ile Gly Ser Thr
310                 315                 320                 325

acg ttc cag gaa tac cgc ggc atc ttc gag aag gac cgt gcc ctg gca    2023
Thr Phe Gln Glu Tyr Arg Gly Ile Phe Glu Lys Asp Arg Ala Leu Ala
                330                 335                 340

cgc cgc ttc cag aag atc gac att gtc gag ccg acc gtc ggt gaa acc    2071
Arg Arg Phe Gln Lys Ile Asp Ile Val Glu Pro Thr Val Gly Glu Thr
            345                 350                 355
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ttc gaa atc ctg cag ggc ctc aag ccc aag tac gaa gcg cat cac ggc    2119
Phe Glu Ile Leu Gln Gly Leu Lys Pro Lys Tyr Glu Ala His His Gly
        360                 365                 370

gtg acc tat gcc gac gac gcg ttg cag gcg gcg gtg gat ctg tcg gtc    2167
Val Thr Tyr Ala Asp Asp Ala Leu Gln Ala Ala Val Asp Leu Ser Val
    375                 380                 385

aag cac atc ggc gac cgt ctg ctg ccg gac aag gcg atc gac gtg atc    2215
Lys His Ile Gly Asp Arg Leu Leu Pro Asp Lys Ala Ile Asp Val Ile
390                 395                 400                 405

gac gaa gcc ggt gcg cgc cag cgt ctg ttg ccc gaa ggg cag cgc aag    2263
Asp Glu Ala Gly Ala Arg Gln Arg Leu Leu Pro Glu Gly Gln Arg Lys
                410                 415                 420

gag ctc atc gac atc gag gag atc gag acc atc gtg gcc caa gat ggc    2311
Glu Leu Ile Asp Ile Glu Glu Ile Glu Thr Ile Val Ala Gln Asp Gly
            425                 430                 435

gcg tat tcc ggc caa gca ggt cag cgc gac cga caa gga cgt gct gca    2359
Ala Tyr Ser Gly Gln Ala Gly Gln Arg Asp Arg Gln Gly Arg Ala Ala
        440                 445                 450

gca tct gga acg caa tct caa gat ggt gat ctt cgg gca gaa ccc ggc    2407
Ala Ser Gly Thr Gln Ser Gln Asp Gly Asp Leu Arg Ala Glu Pro Gly
    455                 460                 465

gat cga aac gct ggc tgg ctc gat caa gct ggc gcg ctc ggg cct ggc    2455
Asp Arg Asn Ala Gly Trp Leu Asp Gln Ala Gly Ala Leu Gly Pro Gly
470                 475                 480                 485

caa tcc gga gaa gcc gat cgg caa ctt cct gtt cgc tgg ccc gac cgg    2503
Gln Ser Gly Glu Ala Asp Arg Gln Leu Pro Val Arg Trp Pro Asp Arg
                490                 495                 500

tgt ggg caa gac cga ggt cac caa gca gct cgc gct gca att ggg cat    2551
Cys Gly Gln Asp Arg Gly His Gln Ala Ala Arg Ala Ala Ile Gly His
            505                 510                 515

cga gct ggt gcg gtt cga cat gtc cga gta cat gga agc gca ttc gat    2599
Arg Ala Gly Ala Val Arg His Val Arg Val His Gly Ser Ala Phe Asp
        520                 525                 530

cag ccg tct gat cgg tgc gcc tcc ggg cta tgt cgg ttt cga tca ggg    2647
Gln Pro Ser Asp Arg Cys Ala Ser Gly Leu Cys Arg Phe Arg Ser Gly
    535                 540                 545

cgg tct gct gac cga aaa gat cgt caa gac gcc gca ctg cgt gct gct    2695
Arg Ser Ala Asp Arg Lys Asp Arg Gln Asp Ala Ala Leu Arg Ala Ala
550                 555                 560                 565

gct gga cga ggt gga gaa ggc gca tcc gga cat ctt caa cat cct gtt    2743
Ala Gly Arg Gly Gly Glu Gly Ala Ser Gly His Leu Gln His Pro Val
                570                 575                 580

gca ggt cat gga ccg cgg cat cct cac cga tac caa cgg gcg cga agc    2791
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Ala Gly His Gly Pro Arg His Pro His Arg Tyr Gln Arg Ala Arg Ser
            585                 590                 595

gaa ctt caa gaa cgt gat cct ggt gat gac gac caa cgc cgg tgc cac    2839
Glu Leu Gln Glu Arg Asp Pro Gly Asp Asp Asp Gln Arg Arg Cys His
        600                 605                 610

gca ggc ctc gcg tcg ttc gat cgg ttt cac caa gca gga tca ttc cac    2887
Ala Gly Leu Ala Ser Phe Asp Arg Phe His Gln Ala Gly Ser Phe His
    615                 620                 625

cga tgc gat gga atc gat ccg ccg cgg ttt cac gcc gga gtt ccg caa    2935
Arg Cys Asp Gly Ile Asp Pro Pro Arg Phe His Ala Gly Val Pro Gln
630                 635                 640                 645

ccg tct gga tgc gat cgt gca gtt cca gcc gct ggg ctt tga            2977
Pro Ser Gly Cys Asp Arg Ala Val Pro Ala Ala Gly Leu
                650                 655

ccacatcctg cgggtggtgg acaagttcat catcgagctg gaaatgctgt tgcaggaaaa  3037

gcacgtgtcg ctgtcggcca cgccgaccgc gcgcgactgg ctggcccagc atggcttcga  3097

tccgctgatg ggtgcgcgcc cgatgtcgcg cgtgatccag gagaagatca agcgcccgct  3157

ggccgacgag ttgctgttcg gcaagctggt ggaaggtggc cgcgtcaata tcgacgtcaa  3217

ggatggcgag ctggtggtcg aagcgcatcc ggaaccggag cgcctgttgc cggctacggt  3277

tgattgatcg ttgcgattgg tcgctgctag agaaaaagcc gctcgaaaga gcggcttttt  3337

tgtgttgaag gcgctggagc tggagcggca ccggtctggc gtactgctgg agcgttgggg  3397

cgggtgccgg cgcatcacgg gtgcccaagt ccgggaggat cgccgtaaac caccgagacg  3457

ccatgcgctt cttacaaccc cgagccgcgc tgcagtggtc gaacaatcac atgatctgcg  3517

ggtgcatcac gaagctgtgc tatcggccgc cgaaaacgtc aacgcacaga tcagcgcgca  3577

ggcgaaagcc tgcccatgta acgcgaccgc acgggcagaa aataaacccc aggcacgaca  3637

aaaagcggca cttggccgct tcgcgtcttg ataccagaac cgcttacttc atgcggtagg  3697

taatacgacc cttggtgagg tcgtacggtg tcatctcaac tttgacacgg tcgccggtga  3757

ggatgcgaat gtagttcttg cgcatacggc cggagatgtg ggcgatgatt tcatgcccgt  3817

tttccagctt gatccggaac gtggtgttgg ggagcgtctc gctgacgctg ccttcgaatt  3877

caatggagtc gtctttcgac atgtaatcct gtgcaatcac ggttggcccg gcagggccgt  3937

aagggacagc attttacgcc ccatctcgcc gaggcgcaaa                       3977
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aagctgggtg aagacggcga gcagccgtcc gcctccgatg gtgagcccaa gagcgatgcg 180

ggcgagggcg aaggcaaggg cgatgccttg gccgagtacg ccaccaacct gaacgatcat 240

gcccgcaacg gcaagatcga cccgctcgtc gggcgtgcgg acgagatcga acgcaccatc 300

caggtcctgt gccgccgccg caagaacaac ccgctgtacg tgggcgaggc cggcgtgggc 360

aagaccgcga tcgccgaagg cctggccaag cgcatcgtcg atgccgacgt gccggaagtg 420

ctggctgacg cggtgatctt ctcgctcgac ctcggcgcac tggtcgctgg caccaagtac 480

cgcggcgact tcgaaaagcg tctcaagggc gtgctgacgg cgctgaagaa ggtgccgaac 540

gcggtgctgt tcatcgacga gatccacacc atcatcggtg cgggctcggc gtcgggcggc 600

accatggacg cctccaacct gatcaagccg gccctggcgt cgggcgagct gcgctgcatc 660

ggctcgacca cgttccagga ataccgcggc atcttcgaga aggaccgtgc cctggcacgc 720

cgcttccaga agatcgacat tgtcgagccg accgtcggtg aaaccttcga aatcctgcag 780

ggcctcaagc ccaagtacga agcgcatcac ggcgtgacct atgccgacga cgcgttgcag 840

gcggcggtgg atctgtcggt caagcacatc ggcgaccgtc tgctgccgga caaggcgatc 900

gacgtgatcg acgaagccgg tgcgcgccag cgtctgttgc ccgaagggca gcgcaaggag 960

ctcatcgaca tcgaggagat cgagaccatc gtggcccaag atg gcg cgt att ccg 1015
Met Ala Arg Ile Pro
1 5

gcc aag cag gtc agc gcg acc gac aag gac gtg ctg cag cat ctg gaa 1063
Ala Lys Gln Val Ser Ala Thr Asp Lys Asp Val Leu Gln His Leu Glu
10 15 20

cgc aat ctc aag atg gtg atc ttc ggg cag aac ccg gcg atc gaa acg 1111
Arg Asn Leu Lys Met Val Ile Phe Gly Gln Asn Pro Ala Ile Glu Thr
25 30 35

ctg gct ggc tcg atc aag ctg gcg cgc tcg ggc ctg gcc aat ccg gag 1159
Leu Ala Gly Ser Ile Lys Leu Ala Arg Ser Gly Leu Ala Asn Pro Glu
40 45 50

aag ccg atc ggc aac ttc ctg ttc gct ggc ccg acc ggt gtg ggc aag 1207

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Lys Pro Ile Gly Asn Phe Leu Phe Ala Gly Pro Thr Gly Val Gly Lys
    55                  60                  65

acc gag gtc acc aag cag ctc gcg ctg caa ttg ggc atc gag ctg gtg    1255
Thr Glu Val Thr Lys Gln Leu Ala Leu Gln Leu Gly Ile Glu Leu Val
70                  75                  80                  85

cgg ttc gac atg tcc gag tac atg gaa gcg cat tcg atc agc cgt ctg    1303
Arg Phe Asp Met Ser Glu Tyr Met Glu Ala His Ser Ile Ser Arg Leu
                90                  95                  100

atc ggt gcg cct ccg ggc tat gtc ggt ttc gat cag ggc ggt ctg ctg    1351
Ile Gly Ala Pro Pro Gly Tyr Val Gly Phe Asp Gln Gly Gly Leu Leu
            105                 110                 115

acc gaa aag atc gtc aag acg ccg cac tgc gtg ctg ctg ctg gac gag    1399
Thr Glu Lys Ile Val Lys Thr Pro His Cys Val Leu Leu Leu Asp Glu
        120                 125                 130

gtg gag aag gcg cat ccg gac atc ttc aac atc ctg ttg cag gtc atg    1447
Val Glu Lys Ala His Pro Asp Ile Phe Asn Ile Leu Leu Gln Val Met
    135                 140                 145

gac cgc ggc atc ctc acc gat acc aac ggg cgc gaa gcg aac ttc aag    1495
Asp Arg Gly Ile Leu Thr Asp Thr Asn Gly Arg Glu Ala Asn Phe Lys
150                 155                 160                 165

aac gtg atc ctg gtg atg acg acc aac gcc ggt gcc acg cag gcc tcg    1543
Asn Val Ile Leu Val Met Thr Thr Asn Ala Gly Ala Thr Gln Ala Ser
                170                 175                 180

cgt cgt tcg atc ggt ttc acc aag cag gat cat tcc acc gat gcg atg    1591
Arg Arg Ser Ile Gly Phe Thr Lys Gln Asp His Ser Thr Asp Ala Met
            185                 190                 195

gaa tcg atc cgc cgc ggt ttc acg ccg gag ttc cgc aac cgt ctg gat    1639
Glu Ser Ile Arg Arg Gly Phe Thr Pro Glu Phe Arg Asn Arg Leu Asp
        200                 205                 210

gcg atc gtg cag ttc cag ccg ctg ggc ttt gac cac atc ctg cgg gtg    1687
Ala Ile Val Gln Phe Gln Pro Leu Gly Phe Asp His Ile Leu Arg Val
    215                 220                 225

gtg gac aag ttc atc atc gag ctg gaa atg ctg ttg cag gaa aag cac    1735
Val Asp Lys Phe Ile Ile Glu Leu Glu Met Leu Leu Gln Glu Lys His
230                 235                 240                 245

gtg tcg ctg tcg gcc acg ccg acc gcg cgc gac tgg ctg gcc cag cat    1783
Val Ser Leu Ser Ala Thr Pro Thr Ala Arg Asp Trp Leu Ala Gln His
                250                 255                 260

ggc ttc gat ccg ctg atg ggt gcg cgc ccg atg tcg cgc gtg atc cag    1831
Gly Phe Asp Pro Leu Met Gly Ala Arg Pro Met Ser Arg Val Ile Gln
            265                 270                 275

gag aag atc aag cgc ccg ctg gcc gac gag ttg ctg ttc ggc aag ctg    1879
Glu Lys Ile Lys Arg Pro Leu Ala Asp Glu Leu Leu Phe Gly Lys Leu
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        280                 285                 290

gtg gaa ggt ggc cgc gtc aat atc gac gtc aag gat ggc gag ctg gtg    1927
Val Glu Gly Gly Arg Val Asn Ile Asp Val Lys Asp Gly Glu Leu Val
    295                 300                 305

gtc gaa gcg cat ccg gaa ccg gag cgc ctg ttg ccg gct acg gtt gat    1975
Val Glu Ala His Pro Glu Pro Glu Arg Leu Leu Pro Ala Thr Val Asp
310                 315                 320                 325

tga tcgttgcgat tggtcgctgc tagagaaaaa gccgctcgaa agagcggctt          2028

ttttgtgttg aaggcgctgg agctggagcg gcaccggtct ggcgtactgc tggagcgttg  2088

gggcgggtgc cggcgcatca cgggtgccca agtccgggag gatcgccgta aaccaccgag  2148

acgccatgcg cttcttacaa ccccgagccg cgctgcagtg gtcgaacaat cacatgatct  2208

gcgggtgcat cacgaagctg tgctatcggc cgccgaaaac gtcaacgcac agatcagcgc  2268

gcaggcgaaa gcctgcccat gtaacgcgac cgcacgggca gaaaataaac cccaggcacg  2328

acaaaaagcg gcacttggcc gcttcgcgtc ttgataccag aaccgcttac ttcatgcggt  2388

aggtaatacg acccttggtg aggtcgtacg gtgtcatctc aactttgaca cggtcgccgg  2448

tgaggatgcg aatgtagttc ttgcgcatac ggccggagat gtgggcgatg atttcatgcc  2508

cgttttccag cttgatccgg aacgtggtgt tggggagcgt ctcgctgacg ctgccttcga  2568

attcaatgga gtcgtctttc gacatgtaat cctgtgcaat cacggttggc ccggcagggc  2628

cgtaagggac agcattttac gccccatctc gccgaggcgc aaattttatg ttaagcggac  2688

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tggcaatgcg acctgggtgg ctacatgctg caggaactgc tcgcgtggca ggcgttgggc  2808

gcccaggcgc atcaggtgcg ggttttctat ctgcgcatcg atcagcggcc agccgcggcc  2868

atgcagctcg gcggcgagcg ctgccagtgc aatcttggag ccgccactgg cgccactgaa  2928

catgctttcg ccgaagaaca tctggccgat cgcaacccca tagatgccgc             2978
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<213> Xanthomonas campestris

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gtgcggccgc cgaagccgcc gcgcaggcca agcgcggcaa aaccgatcgc ccggaacgcc 180

ccggcaagac tccgcccaag gtcgtggcca acgcaccggc gccaaaggtc ggtggcctga 240

gttggccggt gtcgggcaat ctgctggcgc gcttcaacgc cacgctgccg gatggccata 300

ccagcaaggg cgtgctgatc ggcgcgccca agggcagcac ggtcaccgcg gtggccgatg 360

gcacggtggt gttttccgac tggatgaccg gctacggcat gatcctgatc gtggatcacg 420

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gcatcaaacg tggcgaagcc gtggccaagg tcggtagttc gggcgggcag ggtgtgccgg 540

cgctgtactt cgaactgcgt cgcaacggcc agccagtgga tccctcgagc tggctgcagc 600

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cgcggacgac ccggaagcca acgaagccgc cgtctccaag gtg ccg ctg gac gag 1015
Val Pro Leu Asp Glu
1 5

atc cgc cgc ttc gtg gcc gtg tac aac gcg gtc aag cag gcc tac gtg 1063
Ile Arg Arg Phe Val Ala Val Tyr Asn Ala Val Lys Gln Ala Tyr Val
10 15 20

gac ccg gtc gag gac aag aag ctg atg cat gcg gcc gtg cgc ggc ctg 1111
Asp Pro Val Glu Asp Lys Lys Leu Met His Ala Ala Val Arg Gly Leu
25 30 35

ctg tcg gac ctg gat cca cac agc acc tac ttc gac aag gaa gat gcc 1159
Leu Ser Asp Leu Asp Pro His Ser Thr Tyr Phe Asp Lys Glu Asp Ala
40 45 50

gag gcc ttc gac gaa cag gcc acc ggc gcc tat gac ggc atc ggc gtg 1207
Glu Ala Phe Asp Glu Gln Ala Thr Gly Ala Tyr Asp Gly Ile Gly Val
55 60 65

gaa ctg ctg cag cag cag gac aac acg ctc aag gtg att gcg ccg atc 1255
Glu Leu Leu Gln Gln Gln Asp Asn Thr Leu Lys Val Ile Ala Pro Ile
70 75 80 85

gac gac acg ccg gct gca cgc gcc ggg gtc aag gcg ggc gat gtg atc 1303
Asp Asp Thr Pro Ala Ala Arg Ala Gly Val Lys Ala Gly Asp Val Ile

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                90                  95                  100

gtg gcc atc gac ggc aag ccg atc gac gcc agc aag gca atg gag ccg    1351
Val Ala Ile Asp Gly Lys Pro Ile Asp Ala Ser Lys Ala Met Glu Pro
            105                 110                 115

ctg cgc ggc gaa tcc ggc agc aag gtc acc ctg acc atc gtg cgt gac    1399
Leu Arg Gly Glu Ser Gly Ser Lys Val Thr Leu Thr Ile Val Arg Asp
        120                 125                 130

aaa gtc gcc aag ccg ttc gac atc acc ctg cag cgc gaa acc att cgc    1447
Lys Val Ala Lys Pro Phe Asp Ile Thr Leu Gln Arg Glu Thr Ile Arg
    135                 140                 145

gtg gcc agc gtg cgc agc aag ctg ctc gaa ccc ggc tat ggc tac atc    1495
Val Ala Ser Val Arg Ser Lys Leu Leu Glu Pro Gly Tyr Gly Tyr Ile
150                 155                 160                 165

cgc atc agc acc ttc cag gcc gac acc ggc gcc gac ttc cag aag aac    1543
Arg Ile Ser Thr Phe Gln Ala Asp Thr Gly Ala Asp Phe Gln Lys Asn
                170                 175                 180

ctc aag caa ctg cag gcc ggc ggc aag ctg cgt ggc ctg gtg ctg gac    1591
Leu Lys Gln Leu Gln Ala Gly Gly Lys Leu Arg Gly Leu Val Leu Asp
            185                 190                 195

ctg cgc agc aac ccg ggc ggc ctg ctg acc tcg gcc gtg cag gtg gcc    1639
Leu Arg Ser Asn Pro Gly Gly Leu Leu Thr Ser Ala Val Gln Val Ala
        200                 205                 210

gac gat ctg ctc gac aag ggc aac atc gtc agc acc cgc ggg cgc atc    1687
Asp Asp Leu Leu Asp Lys Gly Asn Ile Val Ser Thr Arg Gly Arg Ile
    215                 220                 225

tcc atc agc gac gcc aag ttc gac gca acc ccg ggc gac ctg ctc ggc    1735
Ser Ile Ser Asp Ala Lys Phe Asp Ala Thr Pro Gly Asp Leu Leu Gly
230                 235                 240                 245

ggt gcg ccg gtg gtg gtg ctg gtg gac gcc ggc tcg gca agc gcg tcg    1783
Gly Ala Pro Val Val Val Leu Val Asp Ala Gly Ser Ala Ser Ala Ser
                250                 255                 260

gaa gtg ttg gcc ggc gcg ctg cgc gac aac cag cgc gcg cgc atc atc    1831
Glu Val Leu Ala Gly Ala Leu Arg Asp Asn Gln Arg Ala Arg Ile Ile
            265                 270                 275

ggc agc cgc acc ttc ggc aag ggc tcg gtg cag acc gtg ttg ccg ctg    1879
Gly Ser Arg Thr Phe Gly Lys Gly Ser Val Gln Thr Val Leu Pro Leu
        280                 285                 290

gac aac ggc gac tcg gtc aag ctc acc acc gcg cgc tat tac acg ccc    1927
Asp Asn Gly Asp Ser Val Lys Leu Thr Thr Ala Arg Tyr Tyr Thr Pro
    295                 300                 305

agt ggc aag tcg atc cag gcc agc ggc atc gtg ccc gaa gtg atg ctc    1975
Ser Gly Lys Ser Ile Gln Ala Ser Gly Ile Val Pro Glu Val Met Leu
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acc ccc gaa ccg cag ccg ggc gac gcc gac gtg ccg gcc agc ctc acc    2023
Thr Pro Glu Pro Gln Pro Gly Asp Ala Asp Val Pro Ala Ser Leu Thr
                330                 335                 340

gac ttc agt gag gcg acc ctg ccg ggc cac ctg cgc ggc gat gca gaa    2071
Asp Phe Ser Glu Ala Thr Leu Pro Gly His Leu Arg Gly Asp Ala Glu
            345                 350                 355

ggc gag gag ggc tat agc gcc ggc gac gtg ctg ccg ggc gat ggc ccg    2119
Gly Glu Glu Gly Tyr Ser Ala Gly Asp Val Leu Pro Gly Asp Gly Pro
        360                 365                 370

atc aac gag gcg ctg gcc gaa ctc aag caa cct ggc tca gtc gcc aag    2167
Ile Asn Glu Ala Leu Ala Glu Leu Lys Gln Pro Gly Ser Val Ala Lys
    375                 380                 385

gca cag gcc gcg cgc aag gcc aag gcg caa gcg caa aag ccc aag gcc    2215
Ala Gln Ala Ala Arg Lys Ala Lys Ala Gln Ala Gln Lys Pro Lys Ala
390                 395                 400                 405

atc aag cca acg ccc gag ccc aag ccg gcc gca cca cgc ccg ccc gcc    2263
Ile Lys Pro Thr Pro Glu Pro Lys Pro Ala Ala Pro Arg Pro Pro Ala
                410                 415                 420

agc gag cag acc acg ccg gcc gag ccg acg gac aag gcc aag cca gcg    2311
Ser Glu Gln Thr Thr Pro Ala Glu Pro Thr Asp Lys Ala Lys Pro Ala
            425                 430                 435

gcg cca gta ccg gca gct gtg ccg gcc gag ccg gtc aag taa            2353
Ala Pro Val Pro Ala Ala Val Pro Ala Glu Pro Val Lys
        440                 445                 450

agggcagtgc tgcgggtgcc acgtgcaccc gcagtgcgca gccggcgctg gtgtgcatgc  2413

gcacgtcgtg cgttgtaagt cgtgccgcga atttacatgc agcagttgtt agccacgcat  2473

gcggtgattg gacgcagacg ttgcggaata gaggcacgtc tcgtaggcat cgccggtcgc  2533

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gctcgatgca gtgattcgcg ctcaccacct aagctgggtg acatggaatg cacgcactgc  2893

atatcgcgcg aatgcgtcac caaaatcgat gcgcagcgca gcagcacgac cagtccggat  2953

aacgcaggcc gcaggtgcgc gtgatgcgtg ccacgctgcc accaatacgg cgggttgaaa  3013

acctggccgt tgtgtcggtc atgcgtgctc cctgcacgtc attgcaggtg gccagcaaga  3073
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catgcggtcg tgcctcttgg gcgcactgtg catcgcagga ccacgacgcg tccttgcggg 3133

aagccgcatg gacacatacg gacttgttgc agctgttttc gctacatcgt tctagaagag 3193

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ggcctgaagt atgtggtggt gaccagcgtg gaccgcgacg acctgcgcga cggcggtgcc 240

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Ser Ala Ser Leu Lys Ala Gly Leu Leu Ala Leu Val Leu Thr Thr Pro
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Met Ala Leu Leu Ala Arg Ala Asp Thr Ala Leu Pro Ala Ala Ala Thr
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ccc gaa cag gcg acg gcg acc aaa ctg gtc tac ggg ctg ctc tcg gac    1159
Pro Glu Gln Ala Thr Ala Thr Lys Leu Val Tyr Gly Leu Leu Ser Asp
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agc cgg tat gcg tac cgc ccg cgt acc ctc gac gag gcg atg tcc aag    1207
Ser Arg Tyr Ala Tyr Arg Pro Arg Thr Leu Asp Glu Ala Met Ser Lys
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Asp Val Phe Lys Arg Tyr Leu Glu Thr Leu Asp Gly Gly Lys Gln Phe
70                  75                  80                  85

ttc acc cag gcc gat gtg gat gcg ttc gcg ccg ctg cag gcg ggc gtg    1303
Phe Thr Gln Ala Asp Val Asp Ala Phe Ala Pro Leu Gln Ala Gly Val
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ggt gat gcg ctg cgc ggc ggc aac ctg gag ccg gcg ttc cag gtg ttc    1351
Gly Asp Ala Leu Arg Gly Gly Asn Leu Glu Pro Ala Phe Gln Val Phe
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tcg gtc tac aag aag cgt gtc gat cag cgc gtc aaa tac gcg cgc gaa    1399
Ser Val Tyr Lys Lys Arg Val Asp Gln Arg Val Lys Tyr Ala Arg Glu
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ctg ctc aag cag gat ttc gat ttc acc ggc agc gag aag ttc gag tac    1447
Leu Leu Lys Gln Asp Phe Asp Phe Thr Gly Ser Glu Lys Phe Glu Tyr
    135                 140                 145

gac cgc aag gac gtg ccg tgg gca gcg gac gac aag cag ctg gac gtg    1495
Asp Arg Lys Asp Val Pro Trp Ala Ala Asp Asp Lys Gln Leu Asp Val
150                 155                 160                 165

ctg tgg cgg cag tcg gtg atg aac gac tgg ctg cgc ctg aag ctg gcc    1543
Leu Trp Arg Gln Ser Val Met Asn Asp Trp Leu Arg Leu Lys Leu Ala
                170                 175                 180

ggc aag aag tcg gac gac atc cgc aag acg ctg gac aag cgc tat gcc    1591
Gly Lys Lys Ser Asp Asp Ile Arg Lys Thr Leu Asp Lys Arg Tyr Ala
            185                 190                 195

acg ttg gcc gat tcg gtc aac gaa ctg aag gcc gag gac gcg ttc cag    1639
Thr Leu Ala Asp Ser Val Asn Glu Leu Lys Ala Glu Asp Ala Phe Gln
        200                 205                 210

ttc ttc ctc aac gcc tac acc aat gcg gtt gac ccg cac acc gat tac    1687
Phe Phe Leu Asn Ala Tyr Thr Asn Ala Val Asp Pro His Thr Asp Tyr
    215                 220                 225
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ttc act ccg cgc acc gcc gag aac ttc aac cag cag atg tcg ctg tcg    1735
Phe Thr Pro Arg Thr Ala Glu Asn Phe Asn Gln Gln Met Ser Leu Ser
230                 235                 240                 245

ctg gaa ggc atc ggc gcg cag ctg cag aag cag gac gac atg gtg gtg    1783
Leu Glu Gly Ile Gly Ala Gln Leu Gln Lys Gln Asp Asp Met Val Val
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atc cgc gag gtg atc ccg ggt ggt ccg gct gcg gtg gac ggc acg ctc    1831
Ile Arg Glu Val Ile Pro Gly Gly Pro Ala Ala Val Asp Gly Thr Leu
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aag ccg ggt gac cgc atc gtt ggc gtc ggc cag acc aag agc ggc gcc    1879
Lys Pro Gly Asp Arg Ile Val Gly Val Gly Gln Thr Lys Ser Gly Ala
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atc gaa gat gtg atc ggc tgg cgc atc gac gac gtg gtg gcc aag atc    1927
Ile Glu Asp Val Ile Gly Trp Arg Ile Asp Asp Val Val Ala Lys Ile
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cgc ggc agc aag gac acc cag gtg cgc ctg gag tac atc ccg gcc gag    1975
Arg Gly Ser Lys Asp Thr Gln Val Arg Leu Glu Tyr Ile Pro Ala Glu
310                 315                 320                 325

ctg ggc atc gac ggc acg cac cgc acc gtg acc ctg acg cgg cag aag    2023
Leu Gly Ile Asp Gly Thr His Arg Thr Val Thr Leu Thr Arg Gln Lys
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gtg cgc ctg gcc gaa cag gcc gcc aag ggc gag acc atc acg ctg ccg    2071
Val Arg Leu Ala Glu Gln Ala Ala Lys Gly Glu Thr Ile Thr Leu Pro
            345                 350                 355

gcc agt ggc gac gtg ccg cag cgc cgg atc ggc atc atc aaa ctg ccg    2119
Ala Ser Gly Asp Val Pro Gln Arg Arg Ile Gly Ile Ile Lys Leu Pro
        360                 365                 370

ggt ttc tac cag gat ttc gaa ggc cgt cgc cgt aac gcg gcc gac tat    2167
Gly Phe Tyr Gln Asp Phe Glu Gly Arg Arg Arg Asn Ala Ala Asp Tyr
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gcc tcg gcc acc cgc gat gtc gcc aag ctg ctg gcg ggt ttc aag tcc    2215
Ala Ser Ala Thr Arg Asp Val Ala Lys Leu Leu Ala Gly Phe Lys Ser
390                 395                 400                 405

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Asp Lys Val Asp Gly Val Val Leu Asp Leu Arg Asn Asn Gly Gly Gly
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tcg ctg gac gaa gcg atc gag ctc acc ggg ctg ttc atc gag cag ggc    2311
Ser Leu Asp Glu Ala Ile Glu Leu Thr Gly Leu Phe Ile Glu Gln Gly
            425                 430                 435

ccg gtg gtg cag gtg cgc gaa tcc ggt ggc cgg gtc acc gtc aat ggc    2359
Pro Val Val Gln Val Arg Glu Ser Gly Gly Arg Val Thr Val Asn Gly
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Asn Arg Gly Ser Ala Ser Ala Ser Glu Ile Phe Ala Gly Ala Ile Gln
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gac tac ggc cgt ggc ctg gtc att ggt gaa acc acc ttc ggc aag ggc    2503
Asp Tyr Gly Arg Gly Leu Val Ile Gly Glu Thr Thr Phe Gly Lys Gly
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acg gtg cag aac att gtt gac ctg gac cgc tgg ccg gcc gcc gaa ggg    2551
Thr Val Gln Asn Ile Val Asp Leu Asp Arg Trp Pro Ala Ala Glu Gly
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Gln Arg Tyr Gly Gln Val Lys Leu Thr Ile Ala Gln Phe Phe Arg Val
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agc ggc tcc agc acc cag cac aag ggc gtg gtg ccg gac atc gcc ttc    2647
Ser Gly Ser Ser Thr Gln His Lys Gly Val Val Pro Asp Ile Ala Phe
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ccg gcc agc gtg gat gcc acc gag ttc ggc gaa agc acc tac gac aac    2695
Pro Ala Ser Val Asp Ala Thr Glu Phe Gly Glu Ser Thr Tyr Asp Asn
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gca ctg ccg tgg acg cgc att gcc gcc gtg ccg cac acc cag tac ggc    2743
Ala Leu Pro Trp Thr Arg Ile Ala Ala Val Pro His Thr Gln Tyr Gly
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aac ttc gcc ccc ctg ctg ccg aag ctg cag acc ctg cac gcc acg cgc    2791
Asn Phe Ala Pro Leu Leu Pro Lys Leu Gln Thr Leu His Ala Thr Arg
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Ile Ala Ser Asp Lys Glu Phe Gln Trp Trp Glu Glu Asp Val Lys Gln
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ttc cgt gac gag aag gcc aag aag tac att tcg ttg aac gaa gcc gag    2887
Phe Arg Asp Glu Lys Ala Lys Lys Tyr Ile Ser Leu Asn Glu Ala Glu
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cgc gtg gcc gaa cgg cag aag cag gat cag cag cgc aag gac cgc cag    2935
Arg Val Ala Glu Arg Gln Lys Gln Asp Gln Gln Arg Lys Asp Arg Gln
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Gln Val Arg Lys Gln Leu Gly Leu Pro Leu Asp Pro Leu Ala Asp Asp
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agc gac gac ggc ctg acc ggc aac gag cgt gac atc gtc aag gac acc    3031
Ser Asp Asp Gly Leu Thr Gly Asn Glu Arg Asp Ile Val Lys Asp Thr
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ccg ctg tcg gcg cag gtg ctg ccg caa tcg acg gca ccg ggt cgc tgg    3175
Pro Leu Ser Ala Gln Val Leu Pro Gln Ser Thr Ala Pro Gly Arg Trp
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cgatgtcctg ctgtttgctt ccaacggcaa gaccgtgcgc tttggcgagt cgaccgtgcg 180

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Ser Trp Tyr Tyr Ala Pro Ala Gly Leu Ala Met Leu Ile Ala Gly Val
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Val Ala Ala Thr Leu Leu Trp Thr Trp Trp Glu Ser Gly Ser Asp Tyr
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Ser Arg Ser Val Ala Gly Gly Leu Ala Val Val Phe Val Val Ala Phe
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gcg ttg gcc ttc gtg ccg ttc gga atc acc gag gcc gag ggt gca ttg    1399
Ala Leu Ala Phe Val Pro Phe Gly Ile Thr Glu Ala Glu Gly Ala Leu
        120                 125                 130

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Thr Gln Val Ala Gly Ile Ala Ala Gly Val Val Asn Arg Pro Ala Asp
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Gly Ala Gln Pro Ala Gln Pro Ala Asn Ala Pro Val Asp Asp Asp Trp
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gcc gca tat gga cgc agc cag gct ggg cag cgc tat tcg cca ctc acc    1543
Ala Ala Tyr Gly Arg Ser Gln Ala Gly Gln Arg Tyr Ser Pro Leu Thr
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caa atc aat cgc gac aat gtc agc cag ctg cag cag gcg tgg gtg ttc    1591
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His Thr Gly Asp Val Pro Thr Lys Arg Trp Gly Ala Glu Thr Thr Pro
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aag gtc aag gac gag gcc att cca tac acc gcg gcc tgc cgc ggg gtg    1783
Lys Val Lys Asp Glu Ala Ile Pro Tyr Thr Ala Ala Cys Arg Gly Val
                250                 255                 260

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Glu Gly Thr Leu Asp Gly Arg Leu Ile Ala Leu Asp Ala Arg Thr Gly
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gcc atc gtg cgc ggc gtg gtg gtc atc ggg cat cag gtc ctt gac ggg    2071
Ala Ile Val Arg Gly Val Val Val Ile Gly His Gln Val Leu Asp Gly
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caa aag cgt tat gag ccc tcg ggc gtg atc cag ggc ttt gac gcg gtc    2119
Gln Lys Arg Tyr Glu Pro Ser Gly Val Ile Gln Gly Phe Asp Ala Val
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acc ggc cag ttg cgc tgg gcc tgg gac atg acc cat ccc gaa tgg aat    2167
Thr Gly Gln Leu Arg Trp Ala Trp Asp Met Thr His Pro Glu Trp Asn
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ggt gca ccg ccg cct ggc cag acc tgg acg cgc ggc acc ccc aac atg    2215
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tgg acc acc gca gcg gcc gac gag cag ctg ggt tac gtg tat ctg ccg    2263
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Met Gly Asn Ser Thr Ala Asp Tyr Trp Ser Ser Ser Arg Thr Pro Pro
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Lys Pro Val Trp Asn Phe Gln Thr Thr His Ile Asp Ala Trp Asp Tyr
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Asn Val Pro Ala Val Leu Leu Pro Ser Lys Gln Gly Glu Leu Tyr Val
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ctg gac cgt cgc acc ggc gag ccg ctg gtt ggc gtg gaa gag cgc gcc    2551
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gtg ccc ggc ggt ggt gtg gag ccg cag atg cgc tac aag acc cag ccg    2599
Val Pro Gly Gly Gly Val Glu Pro Gln Met Arg Tyr Lys Thr Gln Pro
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cgc aag gcg agc tac aag ggc atc tac acg ccg ccc gaa gcc gac cgg    2743
Arg Lys Ala Ser Tyr Lys Gly Ile Tyr Thr Pro Pro Glu Ala Asp Arg
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cat tcc atc gaa tac ccc ggc tat aac ggc ggc tcg gac tgg ggc agc    2791
His Ser Ile Glu Tyr Pro Gly Tyr Asn Gly Gly Ser Asp Trp Gly Ser
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Val Ala Val Asp Pro His Arg Gly Val Ile Val Ala Asn Tyr Asn Asp
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gac cgt ccc ttt ggc agt gcg cgc ggc aac ggg ccg ttc ggg att cgc    3127
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Ile Arg Ala Ile Asp Leu Ala Thr Gly Lys Glu Leu Trp His Ala Lys
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gactgtcttg ctcttccttc acggcatcct gcacgtcctg cgccagcgtg gccttgacga 3712

taatcgagcg aatggcgtcg gtggcctctg acagcggtat gtcgctgctc aggcgctgga 3772

aggtatcgcg gctgttatag ccggaaccat ccttgaggta gtgctcgtac atcgacagca 3832

gatcctggca cgccgtgatc agcgcagcca cattgccacg cagcagcgca tggccgatct 3892

ggtcgaagct gtgcagacaa tcggccagcc aatgcaggtc gtagcgtgca gtgctgggtt 3952

cgggcgcgtt gtggccgcgg ctgtaagcgc tgtaacggcg caggctgcgt gccacgcgcg 4012

cgacatgcgc aaacagcgtg ccgatttccg cagcgatatc caggcgctgc accatcacca 4072

tcggaatcac ctggtcgggc gtgtctgaag actgctgcgc cgaggcattc tgttcctgct 4132

gatcgagcga ttgcttcaac accgtgtagc tgcgttgcag ggactccagc tccagcgtgg 4192

tcgccgccgc acgtgctttc agctgcgaca gcgccgcctg atagcgcgca agactgtcct 4252

gggtgctggc gtgctgcccg tactcggcag tgagctggcg cccacgcacg aacgccaacc 4312

ccgtggcgat gagcgcccag agtgcgaagg caggcaccag gtagatcagg atgcccatgg 4372

aggctcctcg gaacgatgca tatcttgtcg gccaggaatc 4412

<210> 44
<211> 486
<212> PRT
<213> Xanthomonas campestris

<400> 44

Met Arg Ala Ser Thr Asp Gln Glu Thr His Pro Met His Ala Thr Ser
1 5 10 15

Arg Pro Cys Pro Arg Thr Phe Trp Gln Arg Ala His Gln Leu Leu Leu
20 25 30

Ile Ala Leu Thr Leu Leu Leu Thr Thr Ala Ser Ala Gln Ala Asp Val

```
        35                  40                  45

Ile Leu His Ala Phe Asn Trp Pro Tyr Ala Thr Val Glu Ala Arg Ala
    50                  55                  60

Lys Gln Ile Ala Asp Ala Gly Tyr Arg Lys Val Leu Val Ala Pro Ala
65                  70                  75                  80

Tyr Arg Ser Glu Gly Ser Ala Trp Trp Ala Arg Tyr Gln Pro Gln Asp
                85                  90                  95

Ile Arg Leu Ile Asp Asn Pro Leu Gly Asp Thr Thr Ala Phe Ala Arg
            100                 105                 110

Met Val Gln Ala Leu Ala Asn Asn Gly Val Glu Thr Tyr Ala Asp Val
        115                 120                 125

Val Phe Asn His Met Ala Asn Glu Ala Ala Thr Arg Ser Asp Leu Asn
    130                 135                 140

Tyr Pro Gly Ser Ala Val Leu Ala Gln Tyr Ala Ala Asn Pro Gly Arg
145                 150                 155                 160

Tyr Asp Ala Leu Arg Leu Phe Gly Thr Val Gln Ser Asn Phe Leu Ser
                165                 170                 175

Gly Ser Asp Phe Gly Pro Ala Gln Cys Ile Ser Asn Tyr Asn Asp Ala
            180                 185                 190

Phe Gln Val Arg Asn Tyr Arg Ile Cys Gly Gly Gly Ser Asp Pro Gly
        195                 200                 205

Leu Pro Asp Leu Leu Gly Asn Asp Trp Val Val Gln Gln Gln Arg Ala
    210                 215                 220

Tyr Leu Gln Ala Leu Lys Gly Leu Gly Val Thr Gly Phe Arg Val Asp
225                 230                 235                 240

Ala Ala Lys His Met Thr Phe Asp His Leu Asn Arg Val Phe Asp Ala
                245                 250                 255

Gly Ile Arg Ser Gly Val Tyr Val Phe Gly Glu Val Ile Thr Gly Gly
            260                 265                 270

Gly Ser Gly Asn Gly Asp Tyr Asp Gln Phe Leu Ala Pro Tyr Leu Gln
        275                 280                 285

Ser Thr Pro His Ala Ala Tyr Asp Phe Pro Leu Phe Asn Ala Val Arg
    290                 295                 300

Thr Ala Phe Gly Val Gly Ala Ser Met Gln Gln Leu Val Asp Pro Ala
305                 310                 315                 320

Ser Ala Gly Gln Ala Leu Pro Gly Asn Arg Ala Val Thr Phe Ala Val
                325                 330                 335

Thr His Asp Ile Pro Asn Asn Ala Gly Phe Arg Tyr Ala Ile Leu Asp
```

340 345 350

Pro Val Asp Glu Thr Leu Ala Tyr Ala Tyr Leu Leu Gly Arg Asn Gly
355 360 365

Gly Val Pro Met Val Tyr Thr Asp Asn Asn Glu Ser Gly Asp Asn Arg
370 375 380

Trp Val Asn Ala Tyr Leu Arg Asp Asp Leu Arg Arg Met Ile Gly Phe
385 390 395 400

His Asn Gly Val Gln Gly Ser Asp Met Gln Val Leu Ser Ser Ser Ala
405 410 415

Cys His Ile Leu Phe Arg Arg Gly Ser Leu Gly Ile Val Gly Ile Asn
420 425 430

Lys Cys Gly Asn Pro Val Asn Thr Thr Val Ala Met Asn Gly Ser Val
435 440 445

Leu Phe Trp Asn Ala Asp Tyr Val Asp Ala Leu Gly Ser Gly Thr Val
450 455 460

Val Arg Ile Ser Ser Gly Ser Tyr Thr Phe Thr Leu Pro Ala Arg Gln
465 470 475 480

Ala Arg Met Trp Arg Arg
485

<210> 45
<211> 570
<212> PRT
<213> Xanthomonas campestris

<400> 45

Val Arg Gly Ala Gly Pro Lys Arg Pro Gly Arg Ala Met Met Arg Ser
1 5 10 15

Val Leu Met Ala Ala Met Leu Leu Tyr Ser Gly Ala Ala Cys Ala Ala
20 25 30

Pro Ala Pro Gly Asp Tyr Tyr Gly Thr Leu Glu Pro Phe Ala Ala Asp
35 40 45

Ala Val Tyr Phe Val Val Thr Asp Arg Phe Val Asn Gly Asp Thr Gly
50 55 60

Asn Asp His Arg Asp Gln Gly Gly Ala His Arg Ser Phe Asp Val Pro
65 70 75 80

Thr Pro Cys Asp Gly Gly Val Gly Asp Asn Ile Gly Tyr Leu Gly Gly
85 90 95

Asp Phe Lys Gly Ile Val Asp His Ala Asp Tyr Ile Arg Gly Leu Gly
100 105 110

Phe Gly Ala Val Trp Ile Thr Pro Ile Val Asp Asn Pro Asp Glu Ala
115 120 125

Phe Thr Gly Gly Lys Pro Ile Thr Cys Glu Ser Thr Leu Ser Asp His
130 135 140

Gly Lys Thr Gly Tyr His Gly Tyr Trp Gly Val Asn Phe Tyr Arg Leu
145 150 155 160

Asp Glu His Leu Pro Ser Pro Gly Leu Asp Phe Ala Gly Phe Thr Arg
165 170 175

Ala Met His Ala Asn Asp Leu Lys Val Val Leu Asp Ile Val Gly Asn
180 185 190

His Gly Ser Pro Ala Tyr Ser Met Pro Val Ala Gln Pro Gly Phe Gly
195 200 205

Lys Leu Tyr Asp Ala Gln Gly Arg Leu Val Ala Asp His Gln Asn Leu
210 215 220

Ala Pro Ala Gln Leu Asp Pro Ala His Asn Pro Leu His Ala Phe Tyr
225 230 235 240

Asn Thr Ser Gly Gly Leu Ala Glu Leu Ser Asp Leu Asn Glu Asp Asn
245 250 255

Pro Ala Val Leu Asp Tyr Leu Ala Gly Ala Tyr Leu Gln Trp Met Glu
260 265 270

Gln Gly Ala Asp Ala Phe Arg Ile Asp Thr Ile Gly Trp Met Pro Asp
275 280 285

Arg Phe Trp His Ala Phe Val Ala Arg Ile Arg Glu Lys Arg Pro Gly
290 295 300

Val Phe Met Phe Gly Glu Ala Phe Asp Tyr Asp Pro Ala Lys Ile Ala
305 310 315 320

Gly His Thr Trp Ala Arg Asn Ala Gly Val Ser Val Leu Asp Phe Pro
325 330 335

Leu Lys Gln Gln Leu Ser Ala Val Phe Gly His Lys Gln Ala Gly Phe
340 345 350

Glu Gln Leu Ala Thr Pro Leu Tyr Leu Arg Lys Gly Pro Tyr Gly Asn
355 360 365

Pro Tyr Glu Leu Met Ser Phe Tyr Asp Asn His Asp Met Ala Arg Leu
370 375 380

Asp Ala Ser Asp Thr Gly Phe Ile Asp Ala His Asn Trp Leu Phe Thr
385 390 395 400

Ala Arg Gly Ile Pro Val Ile Tyr Tyr Gly Ser Glu Thr Gly Phe Met
405 410 415

Arg Gly Arg Ala Glu His Ala Gly Asn Arg Asn Tyr Phe Gly Glu Glu
420 425 430

Arg Val Ser Asn Ala Pro Gln Ser Pro Ile Phe Gly Pro Leu Gln Arg
435 440 445

Ile Ala Thr Leu Arg Arg Asn Thr Pro Ala Leu Gln Arg Gly Val Gln
450 455 460

Val Asp Leu Gln Leu Arg Gly Asn Gln Ala Ala Phe Leu Arg Val Tyr
465 470 475 480

Gln His Ala Gly Met Thr Gln Thr Ala Leu Val Leu Leu Asn Lys Gly
485 490 495

Asp Ala Ala Ala Asp Ile Ala Val Ser Arg Leu Leu Gln Pro Gly Ser
500 505 510

Trp Arg Asp Ala Phe Ser Gly Glu Gln Val Gln Val Gln Gly Arg Val
515 520 525

Thr Leu Gln Val Pro Ala His Gly Val Arg Val Leu Leu Ser Asp Ala
530 535 540

Pro Val Thr Asp Val Ala Leu Arg Lys Gln Leu Asp Ala Gln Met Ala
545 550 555 560

Asp Gln Ala Ala Arg Asp Ala Arg Asn Lys
565 570

<210> 46
<211> 319
<212> PRT
<213> Xanthomonas campestris

<400> 46

Leu Leu Ala Gly Ala Thr Arg Val Leu Ala Gln Asp Arg His Leu Arg
1 5 10 15

Leu Leu Ala Ala Val Leu Ala Arg Leu His Ile Glu Arg Val Val Arg
20 25 30

Leu Pro Pro Arg Ala Gly Arg Pro Pro Gly Pro Ala Gln Pro His Val
35 40 45

Ala Val Leu Phe His Val Ala Gln His Ala Phe Gln Arg Val Val Ala
50 55 60

Asp Arg Ile Val Gly Arg Ala Glu Leu Ala Gln Glu Ala Phe Leu Leu
65 70 75 80

Val Leu Ala Gln Pro Val Gly Lys Ala Ala Gln Leu Val Cys Ala His
85 90 95

Arg Gly Thr Gly Ala Phe Gly Leu Gly Ala Ala Val Val Ala Val Gln
100 105 110

Val Leu Met Arg Phe Glu Gly Gln Ile Val Ala Gly Val Leu Glu Asn
115 120 125

Leu Gln Gly Leu Gly Ile Gly Asp Ala Val Ala Gly Ala Ala Pro Ala
130 135 140

Val Arg Ala Gly Val Gly Arg Ala Arg His Gln Asn Gln Ile Val Arg
145 150 155 160

Ala Gly Leu Ala Asp Gly Val Asp Arg Arg Leu Cys Gly Arg Gly Pro
165 170 175

Val Gly Gly Gly Asp Ala Ile Gly Leu Val His Gln Pro Glu Asp His
180 185 190

Leu Leu Val Val Phe Glu Leu Gln Arg Gln Ala Ala Pro Gln Ile Gly
195 200 205

Gln Cys Cys Arg Arg His Leu Val Gly Ala Asp Ala Leu Ser Val Val
210 215 220

Leu Gly Val Val Val Gln Val Gln Asp Gln Glu Leu Leu Val Gly Leu
225 230 235 240

Gly Gly Gly His Gly Phe Phe Asp Gln Arg Gln Leu Arg Arg Ile Gln
245 250 255

Leu Ala Ile Glu Gly Trp Leu Gln Ala Leu Pro Gln Glu Arg Gln Ala
260 265 270

Asn Gly Val His Ala Leu Ala Gly Glu Ile Ala Glu Ile Arg Arg Arg
275 280 285

Arg Val Gly Val Val Leu Val Glu Arg Ala Gly Leu Leu Ala Arg Val
290 295 300

Glu Leu Gly Ala Gly Asp Val Asp Ala His Val Leu Gln Ser Ala
305 310 315

<210> 47
<211> 555
<212> PRT
<213> Xanthomonas campestris

<400> 47

Val Arg Arg Arg Ser Gly Glu Leu Cys Arg Gln Leu Val Gly Leu Val
1 5 10 15

Phe Phe Leu Ser Thr Ala Leu Pro Ser Ile Ala Arg Gly Ala Gly Gly
20 25 30

Met Ile Ala Met Ile Asp Pro Pro Thr Lys Arg Arg Thr Thr Thr Thr

35 40 45

Gly Ala Trp Leu Ala Val Leu Ser Leu Leu Leu Leu Leu Phe Ser Thr
50 55 60

Pro Ser Val Arg Ala Ala Glu Pro Ala Thr Ser Gly Pro Tyr Gln Trp
65 70 75 80

Arg Ser Val Ala Ile Gly Gly Gly Gly Phe Val Thr Gly Val Leu Phe
85 90 95

His Pro Ala Glu Arg Gly Leu Ala Tyr Ala Arg Thr Asp Val Gly Gly
100 105 110

Ala Tyr Arg Trp Asp Ala Gln Ala Gln Gln Trp Thr Ala Leu Thr Asp
115 120 125

Trp Leu Gly Ala Asp Asp Trp Asn Leu Met Gly Ile Asp Ala Phe Ala
130 135 140

Val Asp Pro Ala Asp Ala Asp Ala Leu Tyr Leu Ala Ala Gly Thr Tyr
145 150 155 160

Met His Glu Arg Ala Gly Thr Ala Ala Val Leu Arg Ser Phe Asn Arg
165 170 175

Gly Arg Thr Phe Glu Arg Ala Asp Leu Pro Phe Lys Leu Gly Gly Asn
180 185 190

Gln Leu Gly Arg Ala Asn Gly Glu Arg Leu Ala Val Asp Pro His Asp
195 200 205

Gly Arg Val Leu Leu Leu Gly Ser Arg Asp Ala Gly Leu Trp Arg Ser
210 215 220

Asp Asp Arg Gly Ala His Trp Ala Lys Val Ala Ser Phe Pro Asp Ala
225 230 235 240

Ala Leu Ala Gly Ala Thr Ala Arg Asn His Val Gly Arg Glu Gln Ala
245 250 255

Val Gly Ile Ala Phe Val Val Phe Asp Ala Ala Ser Gly Asn Asn Gly
260 265 270

Ser Pro Thr Pro Arg Ile Tyr Val Gly Val Ser Thr Glu Gln Thr Ser
275 280 285

Leu Tyr Val Ser Glu Asp Ala Gly Arg Ser Trp Ala Pro Val Ala Gly
290 295 300

Gln Pro Arg Gly Leu Arg Pro Ser His Met Ala Gly Gly Ser Asp Gly
305 310 315 320

His Trp Tyr Leu Ser Tyr Gly Asp Gln Pro Gly Pro Asp Leu Met Ala
325 330 335

Gly Gly Ala Leu Trp Lys Phe Thr Pro Ala Gln Gly Arg Trp Arg Glu

340 345 350

Ile Ser Pro Ile Pro Gln Pro Ala Ser Gly Asp Gly Phe Gly Trp Gly
355 360 365

Ala Val Ala Val Asp Pro Gln His Pro Gln Val Leu Leu Ala Ser Thr
370 375 380

Phe Arg Arg Arg Thr Pro Arg Asp Glu Leu Tyr Arg Ser Val Asp Gly
385 390 395 400

Gly Lys His Trp Thr Pro Leu Leu Ala Asp Ala Val Phe Asp His Ser
405 410 415

Ala Ala Pro Trp Thr Ala His Ala Thr Pro His Trp Met Gly Ala Leu
420 425 430

Ala Ile Asp Pro Phe Asp Gly Asn His Ala Leu Phe Val Thr Gly Tyr
435 440 445

Gly Ile Trp Ala Ser Arg Asn Leu Gln Asp Phe Ala Ala Pro Gln Arg
450 455 460

Pro Leu Gln Trp Trp Phe Gln Asp Arg Gly Leu Glu Glu Thr Val Pro
465 470 475 480

Leu Asp Leu Leu Ser Pro Met Ala Gly Ala His Leu Leu Ser Ala Leu
485 490 495

Gly Asp Ile Asp Gly Phe Arg His Asp Asp Leu Asp Arg Val Gln Leu
500 505 510

Gln Tyr Ala Gly Pro Arg Leu Thr Asn Gly Glu Ser Ile Asp Ala Ala
515 520 525

Gly Gln Ala Pro Gln Trp Val Val Arg Ser Gly Thr Val Arg Ala Arg
530 535 540

Arg Asn Asn Glu Ile Arg Ala Leu Tyr Tyr Ala
545 550 555

<210> 48
<211> 582
<212> PRT
<213> Xanthomonas campestris

<400> 48

Ile Ala Leu Ala Thr Leu Ile Pro Val Thr Ala Pro Ala Met Gln Val
1 5 10 15

Ser Thr Gln Ala Pro Leu Val Asp Ala Thr Gly Gln Thr Leu His Ile
20 25 30

Arg Gly Val Thr Trp Pro Gly Phe Asp Arg Ala Gly Leu Ala Ala Val
35 40 45

Gly Met Arg Asn Asn Thr Leu Ala Gln Leu Leu Asp Arg Met Gln Ala
50 55 60

Ser Asp Ile Asn Ala Val Arg Val Pro Val Cys Ala Ala Val Leu Gln
65 70 75 80

Arg Ala Pro Val Ala Ala Ala Glu Val Ala Gly Asp Ser Thr Leu Arg
85 90 95

Gly Leu Asp Ser Leu Gln Leu Leu Asp Ala Val Val His Ala Ala Ser
100 105 110

Gln Arg Gly Met Gln Val Met Phe Ala Phe Ala Asp Gly Gly Cys Asp
115 120 125

Asp Arg Ala Pro Leu Leu Gly Ala Gln Gln Gln Ala Trp Thr Arg Gly
130 135 140

Leu Val Thr Leu Ala Arg Arg Tyr Gly Gly Asn Ala Asn Val Leu Gly
145 150 155 160

Ile Asp Leu Gly Ser Ser Gly Tyr Arg Asn Ala Ser Trp Ala Gly Asn
165 170 175

Ala Ala Asp Gln Asp Trp Asn Arg Val Ala Ser Arg Ala Val Ala Arg
180 185 190

Val Leu Ala Gln Ala Pro Arg Trp Val Val Gly Val Glu Gly Val Gly
195 200 205

Ser Asn Ala Val Cys Ser Asp Pro Glu Arg Lys Ala Pro Gly Ser Asn
210 215 220

Leu Gln Pro Phe Ala Cys Val Pro Leu Asp Ile Ala Arg Arg His Leu
225 230 235 240

Val Leu Met Pro Lys Leu Ala Gly Pro Asp Arg Asp Thr Thr Asp Ala
245 250 255

Phe Ala Ala Pro Gly Phe Ala Gln Ala Leu Pro Ala Met Trp Gln Arg
260 265 270

Asp Phe Gly Gln Phe Ala Ile Asp His Ala Val Val Pro Val Ser Leu
275 280 285

Gly Gly Gly Leu Gly Asp Gly Asp Pro Arg Asp Pro Ala Trp Gln Thr
290 295 300

Ala Leu Ser Gly Tyr Leu Ala Asn Ala Gly Ile Arg Ser Ala Phe Leu
305 310 315 320

Gly Ser Trp Glu Thr Gly Asn Ala Asn Asn Gly Gly Leu Leu Ala Pro
325 330 335

Asp Gly Ser Pro Arg Ala Asp Lys Leu Leu Ile Leu Arg His Ala Trp
340 345 350

Gly Arg Leu Pro Val Met Pro Ala Ile Ala Thr Ala Thr Gly Asp Ser
355 360 365

Thr Lys Asn Ala Ser Gly Lys Lys Pro Trp Asn Ser Thr Phe Thr Gly
370 375 380

Thr Ala Thr Val Thr Gly Ser Gly Tyr Ser Gly Gly Ala Leu Leu Leu
385 390 395 400

Asp Pro Ile Pro Ser Asp Ala Phe Ile Thr Ala Leu Asn Pro Val Gln
405 410 415

Leu Asn Phe Gly Gly Val Lys Ala Ala Leu Ala Gly Ala Tyr Leu Gln
420 425 430

Val Asn Gly Pro Lys Gly Thr Thr Thr Val Tyr Val Thr Asp Leu Tyr
435 440 445

Pro Glu Gly Ala Ser Gly Gly Leu Asp Leu Ser His Asn Ala Phe Ala
450 455 460

Ala Ile Gly Asp Met Val Gln Gly Arg Ile Pro Ile Ser Trp Lys Val
465 470 475 480

Val Arg Ala Pro Val Thr Gly Asn Leu Gln Tyr Arg Ile Lys Glu Gly
485 490 495

Ser Ser Arg Trp Trp Ala Ala Ile Gln Val Arg Asn His Ala Tyr Pro
500 505 510

Val Val Lys Leu Glu Val Lys Gln Gly Ser Thr Trp Lys Asn Leu Gln
515 520 525

Lys Met Asp Tyr Asn His Phe Leu Gly Glu Gln Leu Gly Asn Gln Pro
530 535 540

Leu Thr Leu Arg Ile Thr Asp Ile Arg Gly Lys Val Leu Thr Asp Thr
545 550 555 560

Leu Pro Arg Leu Pro Glu Asp Gly Ser Lys Pro Ala Tyr Phe Glu Pro
565 570 575

Gly His Val Gln Phe Pro
580

<210> 49
<211> 555
<212> PRT
<213> Xanthomonas campestris

<400> 49

Thr Ser Lys Leu Ala Val Ser Leu Leu Thr Gly Ala Leu Leu Val Pro
1 5 10 15

Val Ala Ala Ser Ala Gln Ser His Val Asp Asn Pro Phe Val Gly Ala
20 25 30

Ser Gly Tyr Leu Asn Pro Asp Tyr Ser Lys Glu Val Asn Ser Ser Ile
35 40 45

Val Lys Val Lys Asp Val Gln Leu Lys Ala Lys Met Gln Val Val Lys
50 55 60

Ser Tyr Pro Thr Ser Val Trp Leu Asp Ser Ile Asn Ala Ile Tyr Gly
65 70 75 80

Gly Ser Arg Asn Ala Gly Arg Leu Ser Leu Gln Gly His Leu Asp Ala
85 90 95

Ala Leu Ala Gln Lys Lys Ala Asn Thr Pro Ile Thr Val Gly Phe Val
100 105 110

Ile Tyr Asp Met Pro Gly Arg Asp Cys His Ala Leu Ala Ser Asn Gly
115 120 125

Glu Leu Pro Leu Thr Gln Ala Gly Leu Gln Arg Tyr Lys Thr Glu Tyr
130 135 140

Ile Asp Val Ile Ala Ser Thr Leu Ala Asn Pro Lys Tyr Lys Asp Leu
145 150 155 160

Arg Ile Val Asn Ile Ile Glu Pro Asp Ser Leu Pro Asn Leu Val Thr
165 170 175

Asn Gln Ser Thr Pro Ala Cys Gly Gln Ala Ala Ser Ser Gly Ile Tyr
180 185 190

Glu Ala Ala Ile Lys Tyr Ala Leu Asp Lys Leu His Ala Thr Pro Asn
195 200 205

Leu Tyr Asn Tyr Leu Asp Ile Gly His Ser Gly Trp Leu Gly Trp Asp
210 215 220

Ser Asn Arg Ser Pro Ala Ile Ser Leu Tyr Thr Arg Val Val Gln Gly
225 230 235 240

Thr Ala Ala Gly Leu Ala Ser Ala Asp Gly Phe Ile Thr Asn Thr Ala
245 250 255

Asn Tyr Thr Pro Leu His Glu Pro Asn Leu Pro Asn Pro Asp Leu Thr
260 265 270

Ile Gly Gly Gln Pro Ile Arg Ser Ser Asn Phe Tyr Gln Trp Asn Ser
275 280 285

Phe Phe Asp Glu Ser Thr Tyr Ala Glu Ala Leu Tyr Asn Gly Phe Val
290 295 300

Gly Ala Gly Trp Ser Ser Lys Ile Gly Phe Leu Ile Asp Thr Gly Arg
305 310 315 320

Asn Gly Trp Gly Gly Lys Ala Arg Pro Ala Ser Ala Ser Gly Asn Asp
325 330 335

Ile Asn Thr Tyr Val Asp Ser Gly Arg Val Asp Arg Arg Leu His Arg
340 345 350

Gly Asn Trp Cys Asn Gln Ser Gly Ala Gly Ile Gly Met Pro Pro Thr
355 360 365

Ala Ala Pro Gly Gly His Ile His Ala Leu Val Trp Gly Lys Gly Pro
370 375 380

Gly Glu Ser Asp Gly Ala Ser Lys Ser Ile Ala Asn Asn Gln Gly Lys
385 390 395 400

Gly Phe Asp Arg Tyr Cys Asp Pro Thr Tyr Thr Thr Pro Asp Gly Thr
405 410 415

Leu Thr Gly Ala Leu Pro Asn Ala Pro Ile Ala Gly Asn Trp Phe His
420 425 430

Ala Gln Phe Leu Gln Leu Val Ala Asn Ala Tyr Pro Ala Ile Gly Thr
435 440 445

Ser Thr Lys Ala Ala Leu Gln Ser Ala Ser Thr Asp Ala Val Pro Ala
450 455 460

Ser Arg Pro Thr Ala Thr Lys Gly Leu Thr Ala Asn Ala Ala Asp Gly
465 470 475 480

Glu Val Arg Leu Ser Trp Ser Pro Val Ala Gly Ala Thr Gly Tyr Thr
485 490 495

Val Gln Arg Val Ala Asp Ala Thr Ala Ala Pro Ile Thr Val Ala Ser
500 505 510

Gly Leu Thr Ser Pro Ser Tyr Val Asp Gln Thr Leu Thr Asn Gly Thr
515 520 525

Thr Tyr Tyr Tyr Lys Val Thr Ala Asn Gly Ala Ser Gly Ala Asp Ala
530 535 540

Ser Ser Val Thr Val Ser Ala Thr Pro His Arg
545 550 555

<210> 50
<211> 535
<212> PRT
<213> Xanthomonas campestris

<400> 50

Val Arg Glu Ser Asp Arg Ser Arg Ser Arg Asp Val Ile Gly Ala Ala
1 5 10 15

Met Val Phe Ser Val Gly Thr Ile Thr Pro Arg Asp Ala Arg Thr Asp

```
            20                  25                  30

Gln Asp Ala Arg Leu Thr Ala Leu Gly Cys Arg Ala Arg Phe Ser Arg
        35                  40                  45

Glu Ile Thr Met Ser Ile Phe Arg Thr Ala Ser Thr Leu Ala Leu Ala
    50                  55                  60

Thr Ala Leu Ala Leu Ala Ala Gly Pro Ala Phe Ser Tyr Ser Ile Asn
65                  70                  75                  80

Asn Ser Arg Gln Ile Val Asp Asp Ser Gly Lys Val Val Gln Leu Lys
                85                  90                  95

Gly Val Asn Val Phe Gly Phe Glu Thr Gly Asn His Val Met His Gly
            100                 105                 110

Leu Trp Ala Arg Asn Trp Lys Asp Met Ile Val Gln Met Gln Gly Leu
        115                 120                 125

Gly Phe Asn Ala Val Arg Leu Pro Phe Cys Pro Ala Thr Leu Arg Ser
    130                 135                 140

Asp Thr Met Pro Ala Ser Ile Asp Tyr Ser Arg Asn Ala Asp Leu Gln
145                 150                 155                 160

Gly Leu Thr Ser Leu Gln Ile Leu Asp Lys Val Ile Ala Glu Phe Asn
                165                 170                 175

Ala Arg Gly Met Tyr Val Leu Leu Asp His His Thr Pro Asp Cys Ala
            180                 185                 190

Gly Ile Ser Glu Leu Trp Tyr Thr Gly Ser Tyr Thr Glu Ala Gln Trp
        195                 200                 205

Leu Ala Asp Leu Arg Phe Val Ala Asn Arg Tyr Lys Asn Val Pro Tyr
    210                 215                 220

Val Leu Gly Leu Asp Leu Lys Asn Glu Pro His Gly Ala Ala Thr Trp
225                 230                 235                 240

Gly Thr Gly Asn Ala Ala Thr Asp Trp Asn Lys Ala Ala Glu Arg Gly
                245                 250                 255

Ser Ala Ala Val Leu Ala Val Ala Pro Lys Trp Leu Ile Ala Val Glu
            260                 265                 270

Gly Ile Thr Asp Asn Pro Val Cys Ser Thr Asn Gly Gly Ile Phe Trp
        275                 280                 285

Gly Gly Asn Leu Gln Pro Leu Ala Cys Thr Pro Leu Asn Ile Pro Ala
    290                 295                 300

Asn Arg Leu Leu Leu Ala Pro His Val Tyr Gly Pro Asp Val Phe Val
305                 310                 315                 320

Gln Ser Tyr Phe Asn Asp Ser Asn Phe Pro Asn Asn Met Pro Ala Ile
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325 330 335

Trp Glu Arg His Phe Gly Gln Phe Ala Gly Thr His Ala Leu Leu Leu
340 345 350

Gly Glu Phe Asp Gly Lys Tyr Gly Glu Gly Asp Ala Arg Asp Lys Thr
355 360 365

Trp Gln Asp Ala Leu Val Lys Tyr Leu Arg Ser Lys Gly Ile Asn Gln
370 375 380

Gly Phe Tyr Trp Ser Trp Asn Pro Asn Ser Gly Asp Thr Gly Gly Ile
385 390 395 400

Leu Arg Asp Asp Trp Thr Ser Val Arg Gln Asp Lys Met Thr Leu Leu
405 410 415

Arg Thr Leu Trp Gly Thr Ala Gly Asn Thr Thr Pro Thr Pro Thr Pro
420 425 430

Thr Pro Thr Pro Thr Pro Thr Pro Thr Pro Thr Pro Thr Pro Thr Pro
435 440 445

Thr Pro Gly Thr Ser Thr Phe Ser Thr Lys Val Ile Val Asp Asn Ser
450 455 460

Trp Asn Gly Gly Tyr Cys Asn Arg Val Gln Val Thr Asn Thr Gly Thr
465 470 475 480

Ala Ser Gly Thr Trp Ser Ile Ala Val Pro Val Thr Gly Thr Val Asn
485 490 495

Asn Ala Trp Asn Ala Thr Trp Ser Gln Ser Gly Ser Thr Leu Arg Ala
500 505 510

Ser Gly Val Asp Phe Asn Arg Thr Leu Ala Ala Gly Ala Thr Ala Glu
515 520 525

Phe Gly Phe Cys Ala Ala Ser
530 535

<210> 51
<211> 333
<212> PRT
<213> Xanthomonas campestris

<400> 51

Met Leu Cys Ile Ala Thr Met Ser Ile Ala Gln Ala Gln Ser Pro Asn
1 5 10 15

Arg Leu Lys Tyr Ala Gly Val Asn Ile Ser Gly Ala Glu Ile Gln Ser
20 25 30

Ser Lys Lys Pro Gly Val Leu Asn Ile Asp Tyr Arg Tyr Pro Thr Ala
35 40 45

Ser Glu Tyr Arg Tyr Phe Ala Gly Lys Gln Met Asn Ile Val Arg Leu
50 55 60

Pro Ile Leu Trp Glu Arg Met Gln Pro Lys Ala Gln Gly Pro Leu Asp
65 70 75 80

Gln Ala Gln Leu Ala Leu Leu Lys Gln Ala Val Ala Asn Ala Lys Ala
85 90 95

Ala Asn Gln Tyr Leu Ile Ile Asp Val His Asn Tyr Ala Lys Tyr Tyr
100 105 110

Gly Gln Lys Ile Gly Ser Lys Arg Val Pro Val Arg Thr Phe Thr Asp
115 120 125

Leu Trp Arg Arg Leu Ala Ile Ala Phe Lys Ser Asp Asn Ala Val Ile
130 135 140

Phe Gly Leu Met Asn Glu Pro Tyr Asp Ile Ser Pro Glu Ser Trp Ala
145 150 155 160

Ala Ala Ala Gln Ala Ser Ile Asp Ser Ile Arg Ala Thr Gly Ala Thr
165 170 175

Asn Leu Ile Leu Val Pro Gly Ala Leu Trp Ser Gly Ala His Ser Trp
180 185 190

Tyr Ser Thr Val Ala Gly Gln Ser Asn Ala Val Ala Leu Ala Asn Ile
195 200 205

Arg Asp Pro Leu Asn Arg Tyr Ala Ile Glu Val His Gln Tyr Leu Asp
210 215 220

Thr Asp Ser Ser Gly Thr Ser Ala Gly Cys Val Ser Arg Thr Ile Gly
225 230 235 240

Ala Glu Arg Leu Arg Ser Phe Thr Gly Trp Leu Arg Ala Gln Gly Lys
245 250 255

Arg Gly Phe Leu Gly Glu Phe Gly Thr Ala Asn Asn Ala Thr Cys Thr
260 265 270

Ala Ala Leu Asp Gly Met Leu Gly Tyr Leu Glu Thr Asn His Asp Val
275 280 285

Trp Ile Gly Trp Thr Phe Trp Ala Ala Gly Ala Trp Trp Asn Thr Ser
290 295 300

Tyr Pro Phe Asn Val Gln Pro Asp Ala Gln Gly Arg Asp Lys Pro Gln
305 310 315 320

Met Lys Thr Leu Ser Ala Arg Ala His Arg Val Thr Arg
325 330

<210> 52

<211> 335
<212> PRT
<213> Xanthomonas campestris

<400> 52

Val Phe Phe Leu Leu Leu Gly Val Leu Pro Met Gly His Ala Gln Thr
1 5 10 15

Arg Ala Leu Lys Tyr Ala Gly Val Asn Leu Ala Gly Ala Glu Phe Ala
20 25 30

Ser Ser Lys Lys Pro Gly Val Leu Asn Lys Asp Tyr Met Tyr Pro Ala
35 40 45

Ser Thr Asp Tyr Ser Tyr Phe Ala Gly Thr Gly Met Asn Val Ile Arg
50 55 60

Leu Pro Ile Leu Trp Glu Arg Leu Gln Pro Ala Ala Arg Gly Glu Leu
65 70 75 80

Asp Pro Ala Gln Leu Ala Leu Val Gln Gln Ala Val Ala Arg Ala Lys
85 90 95

Ala Ser Gly Met Tyr Leu Val Leu Asp Ile His Asn Tyr Ser Lys Tyr
100 105 110

Tyr Gly Tyr Lys Met Gly Gly Pro Glu Val Pro Leu Ala Thr Phe Ala
115 120 125

Asp Leu Trp Arg Arg Leu Ala Val Ile Phe Asn Ser Asp Asn Ala Val
130 135 140

Ile Phe Gly Leu Met Asn Glu Pro Asn Asn Ile Ser Ala Ser Glu Trp
145 150 155 160

Ala Gly Ala Ala Gln Ala Gly Ile Asp Ala Ile Arg Ala Thr Gly Ala
165 170 175

Asn Asn Leu Ile Leu Val Pro Gly Ala Leu Trp Thr Gly Ala His Ser
180 185 190

Trp His Ser Leu Thr Ser Asp Gly Tyr Ser Asn Ala Thr Ala Leu Ala
195 200 205

Ser Ile Ser Asp Pro Leu Asn Arg Tyr Ala Phe Glu Val His Gln Tyr
210 215 220

Leu Asp Ala Asp Ser Ser Gly Thr Ser Ser Val Cys Val Ser Glu Thr
225 230 235 240

Ile Gly Ala Asp Arg Leu Arg Ala Phe Thr Glu Trp Leu Arg Thr Asn
245 250 255

Asn Lys Arg Gly Phe Leu Gly Glu Phe Gly Thr Ala Asn Asn Ala Val
260 265 270

Cys Asn Thr Ala Leu Gln Gly Met Leu Ala Tyr Met Glu Asn Tyr Ala
275 280 285

Asp Val Trp Leu Gly Trp Thr Trp Trp Ala Ala Gly Ala Trp Trp Asn
290 295 300

Thr Ser Tyr Ala Tyr Asn Val His Pro Asn Lys Asp Gly Thr Asp Lys
305 310 315 320

Pro Gln Met Val Ile Leu Ser Pro Gln Ala Ala Arg Ala Thr Arg
325 330 335

<210> 53
<211> 343
<212> PRT
<213> Xanthomonas campestris

<400> 53

Ile Leu Pro Pro Tyr Leu Leu Asp His Val Ala Gln Ala Ala Pro Glu
1 5 10 15

Arg Ala Arg His Cys Ala Gln Leu Thr Arg His Ile Thr Ala Gln Leu
20 25 30

Arg Gln Arg Arg Ala Gln Gly Leu Leu Ala Arg Asp Ser Ala Asp Asp
35 40 45

Ala Pro Thr Ala Thr Thr Asp Thr Ala Val Gln Arg His Leu Tyr Asp
50 55 60

Ala Gln Gln Gly Thr Ala Leu Pro Gly Val Leu Val Arg Glu Glu Gly
65 70 75 80

Ala Pro Pro Thr Asp Asp Val Ala Val Thr Glu Ala Tyr Asp Tyr Leu
85 90 95

Gly Ala Thr His Ala Phe Phe Gln Gln Val Tyr Ala Arg Asn Ser Ile
100 105 110

Asp Asp Ala Gly Met Pro Leu Leu Gly Thr Val His Tyr Glu Arg Asn
115 120 125

Tyr Asp Asn Ala Phe Trp Thr Gly Glu Gln Met Val Phe Gly Asp Gly
130 135 140

Asp Gly Glu Ile Phe Thr Arg Phe Thr Ile Ala Ile Asp Val Val Ala
145 150 155 160

His Glu Leu Thr His Gly Val Ile Glu Arg Thr Ala Asn Leu Ile Tyr
165 170 175

Gln Gly Gln Ser Gly Ala Leu Asn Glu Ser Val Ser Asp Val Phe Gly
180 185 190

Val Leu Val Lys Gln Tyr Ala Leu Arg Gln Asp Ala Ala Gln Ala Asp

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        195                 200                 205

Trp Leu Val Gly Ala Gly Met Phe Leu Pro Gly Val Gln Gly Val Ala
    210                 215                 220

Leu Arg Ser Met Gln Ala Pro Gly Thr Ala Tyr Asp Asp Pro Ala Leu
225                 230                 235                 240

Gly Lys Asp Pro Gln Pro Ala His Met Asp Ala Tyr Val Asp Thr Gln
                245                 250                 255

Glu Asp Asp Gly Gly Val His Tyr Asn Ser Gly Ile Pro Asn Arg Ala
            260                 265                 270

Phe Gln Arg Ala Ala Val Ala Ile Gly Gly Tyr Ala Trp Glu Lys Ala
        275                 280                 285

Gly Arg Ile Trp Tyr Arg Ala Leu Thr Gly Gly Ala Leu Ser Ala Ser
    290                 295                 300

Ala Asp Phe Ala Thr Phe Ala Ala Leu Thr Val Arg Val Ala Ser Thr
305                 310                 315                 320

Asp Tyr Gly Ala Gly Ser Ala Glu Ala Ser Ala Val Glu Gln Ala Trp
                325                 330                 335

Arg Asp Val Gly Val Leu Ala
            340


<210>      54
<211>      289
<212>      PRT
<213>      Xanthomonas campestris

<400>      54

Arg Val Val Leu Phe Leu Leu Thr Asn Phe Ala Val Leu Ile Leu Ala
1               5                   10                  15

Gly Ile Val Met Ser Val Leu Gly Val Asn Pro Ala Gln Met Ser Gly
            20                  25                  30

Leu Leu Val Met Ala Ala Ile Phe Gly Phe Gly Gly Ser Phe Ile Ser
        35                  40                  45

Leu Leu Leu Ser Lys Phe Met Ala Lys Arg Ser Thr Gly Ala Gln Val
    50                  55                  60

Ile Thr Glu Pro Arg Thr Gln Thr Glu Arg Trp Leu Val Asp Thr Val
65                  70                  75                  80

Arg Arg Gln Ala Gln Ala Ala Gly Ile Gly Met Pro Glu Val Ala Ile
                85                  90                  95

Tyr Asp Gly Pro Glu Ile Asn Ala Phe Ala Thr Gly Ala Asn Arg Asn
            100                 105                 110
```

Asn Ala Leu Val Ala Val Ser Thr Gly Leu Leu Gln His Met Arg Glu
115 120 125

Asp Glu Ala Glu Ala Val Leu Gly His Glu Ile Ala His Ile Ala Asn
130 135 140

Gly Asp Met Val Thr Met Ala Leu Leu Gln Gly Val Leu Asn Thr Phe
145 150 155 160

Val Ile Val Leu Ala Arg Val Val Gly Gly Ile Ile Asp Ser Ala Leu
165 170 175

Ser Gly Asn Arg Asp Ser Gly Arg Gly Phe Ala Tyr Tyr Ile Ile Val
180 185 190

Phe Val Leu Glu Met Val Phe Gly Leu Phe Ala Thr Met Ile Ala Met
195 200 205

Trp Phe Ser Arg Arg Arg Glu Phe Arg Ala Asp Ala Gly Gly Ala Gln
210 215 220

Leu Ala Gly Arg Asn Lys Met Ile Ala Ala Leu Glu Arg Leu Ser Leu
225 230 235 240

Asn His Gly Gln Asn Thr Leu Pro Ser Gln Val Gln Ala Phe Gly Ile
245 250 255

Ser Gly Gly Val Gly Glu Gly Leu Arg Arg Leu Phe Leu Ser His Pro
260 265 270

Pro Leu Thr Glu Arg Ile Ala Ala Leu Arg Ala Ser Asn Gly Thr Ala
275 280 285

Met

<210> 55
<211> 580
<212> PRT
<213> Xanthomonas campestris

<400> 55

Met Ser Thr Ala Ser Leu Arg Lys Arg Thr Gly Ser Leu Thr Ile Leu
1 5 10 15

Gly Ala Ser Ala Leu Thr Ser Leu Leu Leu Ala Met Pro Ala Phe Ala
20 25 30

Gly Glu Val Tyr Leu Asp Gly Leu Ala Thr Ala Gln Thr His Gln Lys
35 40 45

Phe Ile Val Thr Tyr Lys Asp Gly Ser Thr Ala Leu Ala Ser Pro Ser
50 55 60

Ala Leu Thr Thr Ser Leu Arg Thr Ala Ala Arg Ala Val Pro Ala Lys

65 70 75 80

Ala Gly Lys Ala Leu Gly Leu Asn Ser Val Arg Arg Leu Ala Leu Gly
85 90 95

Pro Glu Leu Val Arg Ala Asp Arg Ala Leu Asp Arg Ala Glu Ala Glu
100 105 110

Thr Leu Met Arg Gln Leu Ala Ala Asp Pro Asn Val Gln Ser Val Glu
115 120 125

Val Asp Gln Ile Leu His Ala Thr Leu Thr Pro Asn Asp Thr Arg Leu
130 135 140

Ser Glu Gln Trp Ala Phe Gly Thr Thr Asn Ala Gly Leu Asn Ile Arg
145 150 155 160

Pro Ala Trp Asp Lys Ala Thr Gly Ser Gly Thr Val Val Ala Val Ile
165 170 175

Asp Thr Gly Ile Thr Ser His Ala Asp Leu Asn Ala Asn Ile Leu Ala
180 185 190

Gly Tyr Asp Phe Ile Ser Asp Ala Thr Thr Ala Arg Asp Gly Asn Gly
195 200 205

Arg Asp Ser Asn Ala Ala Asp Glu Gly Asp Trp Tyr Ala Ala Asn Glu
210 215 220

Cys Gly Ala Gly Ile Pro Ala Ala Ser Ser Ser Trp His Gly Thr His
225 230 235 240

Val Ala Gly Thr Val Ala Ala Val Thr Asn Asn Thr Thr Gly Val Ala
245 250 255

Gly Thr Ala Tyr Gly Ala Lys Val Val Pro Val Arg Val Leu Gly Lys
260 265 270

Cys Gly Gly Ser Leu Ser Asp Ile Ala Asp Ala Ile Val Trp Ala Ser
275 280 285

Gly Gly Thr Val Ser Gly Ile Pro Ala Asn Ala Asn Pro Ala Glu Val
290 295 300

Ile Asn Met Ser Leu Gly Gly Gly Gly Ser Cys Ser Thr Thr Met Gln
305 310 315 320

Asn Ala Ile Asn Gly Ala Val Ser Arg Gly Thr Thr Val Val Val Ala
325 330 335

Ala Gly Asn Asp Ala Ser Asn Val Ser Gly Ser Leu Pro Ala Asn Cys
340 345 350

Ala Asn Val Ile Ala Val Ala Ala Thr Thr Ser Ala Gly Ala Lys Ala
355 360 365

Ser Tyr Ser Asn Phe Gly Thr Gly Ile Asp Val Ser Ala Pro Gly Ser

370 375 380

Ser Ile Leu Ser Thr Leu Asn Ser Gly Thr Thr Thr Pro Gly Ser Ala
385 390 395 400

Ser Tyr Ala Ser Tyr Asn Gly Thr Ser Met Ala Ser Pro His Val Ala
405 410 415

Gly Val Val Ala Leu Val Gln Ser Val Ala Pro Thr Ala Leu Thr Pro
420 425 430

Ala Ala Val Glu Thr Leu Leu Lys Asn Thr Ala Arg Ala Leu Pro Gly
435 440 445

Ala Cys Ser Gly Gly Cys Gly Ala Gly Ile Val Asn Ala Asp Ala Ala
450 455 460

Val Thr Ala Ala Ile Asn Gly Gly Ser Gly Gly Gly Gly Gly Gly Gly
465 470 475 480

Asn Thr Leu Thr Asn Gly Thr Pro Val Thr Gly Leu Gly Ala Ala Thr
485 490 495

Gly Ala Glu Leu Asn Tyr Thr Ile Thr Val Pro Ala Gly Ser Gly Thr
500 505 510

Leu Thr Val Thr Thr Ser Gly Gly Ser Gly Asp Ala Asp Leu Tyr Val
515 520 525

Arg Ala Gly Ser Ala Pro Thr Asp Ser Ala Tyr Thr Cys Arg Pro Tyr
530 535 540

Arg Ser Gly Asn Ala Glu Thr Cys Thr Ile Thr Ala Pro Ser Gly Thr
545 550 555 560

Tyr Tyr Val Arg Leu Lys Ala Tyr Ser Thr Phe Ser Gly Val Thr Leu
565 570 575

Arg Ala Ser Tyr
580

<210> 56
<211> 483
<212> PRT
<213> Xanthomonas campestris

<400> 56

Met Arg Arg Leu Ser Ala Gly Pro Met Leu Leu Val Ala Asp Arg Arg
1 5 10 15

Leu Asp Arg Val Asp Ser Glu Ser Leu Met Arg Arg Leu Ala Ala Asp
20 25 30

Pro Thr Val Lys Arg Val Glu Val Asp Val Leu Met Arg Pro Leu Leu
35 40 45

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Ala Pro Asn Asp Pro Gly Leu Pro Gln Gln Trp Ala Met Gly Thr Thr
    50                  55                  60

Thr Ala Ser Leu Asn Val Arg Pro Ala Trp Asp Arg Thr Thr Gly Lys
65                  70                  75                  80

Gly Ile Val Val Ala Val Ile Asp Thr Gly Ile Thr Ala His Pro Asp
                85                  90                  95

Leu Ala Ala Asn Val Leu Pro Gly Tyr Asp Phe Ile Thr Asp Pro Thr
            100                 105                 110

Val Ala Gly Asp Gly Asn Gly Arg Asp Asn Asn Ala Ala Asp Gln Gly
        115                 120                 125

Asp Trp Ser Ala Ala Asn Ala Cys Gly Ala Gly Ala Ser Ala Ser Asn
    130                 135                 140

Ser Ser Trp His Gly Thr His Val Ala Gly Ile Val Ala Ala Val Gly
145                 150                 155                 160

Asn Asn Ala Ala Gly Val Val Gly Thr Ala Phe Asn Ala Lys Leu Leu
                165                 170                 175

Pro Leu Arg Val Leu Gly Lys Cys Gly Gly Tyr Met Ser Asp Ile Ala
            180                 185                 190

Asp Ala Ile Val Trp Ala Ser Gly Gly Lys Val Thr Gly Val Pro Ala
        195                 200                 205

Asn Pro Asn Pro Ala Thr Val Ile Asn Leu Ser Leu Gly Gly Tyr Gly
    210                 215                 220

Ser Cys Ser Thr Ile Ile Gly Asn Ala Ile Thr Gly Ala Val Thr Arg
225                 230                 235                 240

Gly Thr Ala Val Val Val Ala Ala Gly Asn Ser Asn Met Asp Val Ala
                245                 250                 255

Thr Ser Met Pro Ala Asn Cys Ala Asn Val Ile Ala Val Ala Ala Thr
            260                 265                 270

Thr Ser Ala Gly Ala Lys Ala Ser Phe Ser Asn Phe Gly Lys Gly Val
        275                 280                 285

Asp Ile Ala Ala Pro Gly Gln Ala Ile Ile Ser Thr Leu Asn Ser Gly
    290                 295                 300

Thr Thr Val Pro Ala Asn Pro Ala Tyr Ala Val Tyr Ser Gly Thr Ser
305                 310                 315                 320

Met Ala Ala Pro His Val Ala Gly Val Val Ala Leu Met Gln Ser Val
                325                 330                 335

Ala Leu Asn Pro Leu Thr Pro Ala Thr Val Glu Ala Leu Leu Lys Ser
            340                 345                 350
```

Ser Ala Arg Pro Leu Pro Val Ala Cys Ala Pro Gly Cys Gly Ala Gly
355 360 365

Leu Val Asn Ala Asp Gly Ala Val Ala Ala Val Ile Asn Ala Thr Leu
370 375 380

Leu Thr Ser Asn Ala Val Arg Thr Gly Leu Ser Ala Ala Ile Gly Asp
385 390 395 400

Ser Leu Tyr Tyr Gln Val Lys Val Pro Ala Gly Thr Arg Ser Leu Lys
405 410 415

Val Thr Leu Ser Gly Gly Ser Gly Asn Ala Asp Leu Ser Leu Arg Ala
420 425 430

Asn Ala Leu Pro Thr Asp Ala Ala Phe Gly Cys Arg Ser Met Leu Val
435 440 445

Gly Asn Thr Glu Ala Cys Thr Leu Thr Ala Pro Ala Ala Gly Thr Tyr
450 455 460

Tyr Val Arg Leu Lys Gly Thr Leu Ala Phe Ser Ala Val Asn Leu Val
465 470 475 480

Ala Thr Tyr

<210> 57
<211> 549
<212> PRT
<213> Xanthomonas campestris

<400> 57

Ser Asp Pro Leu Phe Arg Tyr Gln Trp His Leu Leu Asn Asp Gly Gln
1 5 10 15

Glu Val Ile Ala Asp Thr Arg Pro Arg Ala Gly Thr Asp Leu Asn Val
20 25 30

Gly Pro Leu His Thr Leu Gly Leu Arg Gly Gln Gly Val Thr Val Ala
35 40 45

Val Val Asp Asp Ala Leu Glu Leu Arg His Pro Asp Leu Val Ala Asn
50 55 60

Val Val Pro Gly Gly Ser Lys Asn Phe Val Asp Gly Ser Asn Asp Pro
65 70 75 80

Thr Pro Arg Asn Gly Ala Ser His Gly Thr Met Val Gly Gly Ile Met
85 90 95

Ala Ala Val Gly Trp Asn Gly Leu Gly Gly Arg Gly Val Ala Pro Asp
100 105 110

Ala Arg Leu Lys Gly Phe Asn Ile Leu Ser Ser Glu Glu Ser Pro Thr

```
        115                 120                 125

Asp Phe Asp Thr Asn Leu Arg Ala Ser Trp Gly Asp Ser Val Gln Ser
    130                 135                 140

Arg Asp Val Asp Val Phe Asn Asn Ser Phe Gly Ser Asp Leu Thr Tyr
145                 150                 155                 160

Tyr Pro Thr Ile Ser Pro Ala Ala Glu Arg Ser Leu Asp Arg Leu Met
                165                 170                 175

Arg Arg Ala Arg Asn Gly Lys Gly Gly Leu Tyr Val Gln Ala Ala Gly
            180                 185                 190

Asn Thr Phe Asp Ser Phe Thr Val Leu Asp Asp Gln Gly Asn Trp Val
        195                 200                 205

Glu Arg Cys Pro Val Leu Ala Arg Thr Leu Gly Val Thr Cys Ser Thr
    210                 215                 220

Pro Ala Thr Asp Pro Leu Ser Asn Gln Pro Leu Ile Ile Ala Thr Gly
225                 230                 235                 240

Ala Val Asn Ala Arg Gly Leu Arg Ser Ser Tyr Ser Ser Ala Gly Ala
                245                 250                 255

Ala Leu Trp Val Thr Gly Phe Gly Gly Glu Phe Gly Leu Gln Arg Arg
            260                 265                 270

Tyr Phe Gly Asp Arg Pro Arg Pro Ala Leu Phe Asp Pro Ala Ile Val
        275                 280                 285

Thr Thr Asp Leu Thr Gly Cys Ala Val Gly Asp Asn Arg Asp Ile Ala
    290                 295                 300

Gly Gln Pro Pro Ile Asn Ala Leu Ala Ser Ser Ser Ser Pro Ile Asp
305                 310                 315                 320

Ala Ser Cys Asn Tyr Ser Ala Ala Met Asn Gly Thr Ser Ala Ala Ala
                325                 330                 335

Pro Thr Val Ala Gly Val Val Ala Leu Ile Val Gln Ala Asn Pro Ser
            340                 345                 350

Leu Thr Ala Arg Asp Leu Lys Tyr Ile Leu Ala Thr Ser Ala Arg Gln
        355                 360                 365

Ile Asp Pro Ala Gln Gln Val Ile Arg Tyr Gln Gly Ser Val Ile Glu
    370                 375                 380

Pro Gly Trp Ile Thr Asn Ala Ala Gly His Ala Phe Ser Asn Trp Tyr
385                 390                 395                 400

Gly Phe Gly Leu Val Asp Ala Ala Glu Ala Val Tyr Arg Ala Tyr Gly
                405                 410                 415

Phe Gln Pro Leu Pro Pro Gln Arg Asp Leu Gly Trp Lys Ala Ala Arg
```

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            420                 425                 430

Ala Gly Thr Ser Thr Ile Gly Gly Pro Asn Ala Ala Ala Thr Leu Arg
        435                 440                 445

Leu Arg Leu Gly Asp Thr Leu Lys Ile Asp Thr Val Gln Trp Ser Met
    450                 455                 460

Gln Thr Thr His Lys Thr Pro Ser Asn Leu Arg Val Val Leu Ile Ser
465                 470                 475                 480

Pro Ser Gly Thr Arg Ser Tyr Val Leu Thr Pro Phe Gln Ala Leu Asp
                485                 490                 495

Thr Ile Thr Gln Gly Ala Gly Phe Glu Ile Pro Leu Ser Thr Ser Asn
            500                 505                 510

Ala Phe Leu Asp Glu Asn Val Ala Gly Thr Trp Thr Leu Glu Val Thr
        515                 520                 525

Asp Met Thr Gly Ser Asp Val Pro Ala Gln Leu Thr Gly Phe Lys Leu
    530                 535                 540

Arg Ile Leu Gly His
545
```


<210> 58
<211> 348
<212> PRT
<213> Xanthomonas campestris

<400> 58

```
Ser Val Leu Arg Arg Gly Val Leu Gly Lys Val Leu Val Ala Val Gly
1               5                   10                  15

Ile Gly Asp Arg Leu Gly Arg Val Ala Asp Arg Gln Ala Ala Cys Ala
            20                  25                  30

Gly Leu Thr Ile His Ala Val Leu Gly Ala Gly His His Gly Glu Val
        35                  40                  45

Ala Gly Leu Val His Gln Arg Ala Gly Leu Gly Val Gly Ala Gly Cys
    50                  55                  60

Arg Arg Ala Pro Glu Arg Val Ala Asp Met Asp Leu Val Arg Leu Val
65                  70                  75                  80

Arg Ile Asp Val Ser Glu Gly Val Arg Gln Ile Arg Phe Ala Ala Ala
                85                  90                  95

Val Asp Arg Gln Leu Ala Ile Val Leu Val Gln Arg Val Val Asp Val
            100                 105                 110

Asp Glu Val Gly Ala Asp Pro Ala Val Ala Arg Gly Val Val Gly Ala
        115                 120                 125
```

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Glu Pro Gly Gly Val Ala Arg Pro Gly Ala Ala Ala Val Glu Val Gly
    130                 135                 140

Thr Arg Val Leu Arg Val Ile Thr Arg Gly Ser Asp Ala Thr Gly Gly
145                 150                 155                 160

Leu Val Gly Ala Gly Gly Ala Ala Val Glu Ile Val Asp Ala Val Asp
                165                 170                 175

His Gly Gly Arg Ala Asp Cys Glu Leu Ala Leu Tyr Thr Thr Ser Arg
            180                 185                 190

Ala Ile Gln Pro Asn Ser Glu Arg Gly Ala Gly Gly His Cys Arg Gln
        195                 200                 205

Ala Val Cys Gly Leu His Arg Ala Ala Ile Gly Gln Arg Gly Val Leu
    210                 215                 220

Gln Arg Arg Ala His Leu Asp Gly Val Val Ala Ala Gly Gly Gln Val
225                 230                 235                 240

Ile Gly Ala Gly Gln Ile His Leu Ala Leu Asp Ala Leu Ala Arg Leu
                245                 250                 255

Gln Asp Gly Glu Val Gly Cys Leu Gly Gln Ala Ala Leu Asp Gln Ala
            260                 265                 270

Pro Gly Val Val His Arg Leu Ala Val Ala Ala His Leu Gln Asp Ala
        275                 280                 285

Val Val Gln Arg Leu Gln Arg Gln Leu Ile Gly Arg Asn Ala Gly Asn
    290                 295                 300

Leu Ala Thr Val Val Gly Asp Gly Asp Arg Asp Leu Ala Leu Met Ser
305                 310                 315                 320

Pro Gly Leu Val Gly His Trp Arg Gln Phe Asp Gly Gln Arg Asn Arg
                325                 330                 335

Ser Ala His Gly Leu Cys Leu Arg Arg Thr Glu His
            340                 345


<210>      59
<211>      595
<212>      PRT
<213>      Xanthomonas campestris

<400>      59

Val Val Val Ala His Ser Gln Gly Ser Met Ile Ala Tyr Asp Val Leu
1               5                   10                  15

Arg Gln Leu Gln Ala Asp Gly Cys Glu Val Ala Leu Phe Leu Thr Leu
            20                  25                  30
```

Gly Ser Pro Leu Gly Leu Pro Gln Val Arg Ser Met Phe Lys Arg Trp
35 40 45

Thr Gly Thr Arg Lys Leu Pro Phe Pro Asp Cys Val Arg Arg Trp Val
50 55 60

Asn Val Ala Glu Thr Arg Asp Pro Ile Ala Leu Asp Pro Asp Leu Thr
65 70 75 80

Asp Asp Ile Ala Asn Ala Lys Gly Arg Phe Glu Asn Ile Ala Ala Ala
85 90 95

Arg Leu Asn Pro Asp Trp Glu His Asn Pro His Ser Gly Ser Gly Tyr
100 105 110

Leu Ala Ile Ala Gln Val Arg Ala Ala Val Arg Gln Ala Val Gly Val
115 120 125

Gly Phe Asp Gln Pro Val Ser Asn Ala Val Leu Ile Lys Asp Leu Ser
130 135 140

Glu Gln Leu Glu Ala His Gly Ala Asp Tyr Arg His Glu Val Leu Ile
145 150 155 160

Glu Leu Asp Arg Arg Val Leu Gly Ala Asp Pro Ala Gly Val Arg Ala
165 170 175

Gln Leu Ile Thr His Met Arg Gln Ile Ala Gly His Ser Thr Gly Leu
180 185 190

Asp Gly Asp Ala Leu Asp Glu Ala Ile Glu Leu Glu Asp Ser Leu Gln
195 200 205

Arg Leu Ile Ser Ala Arg Leu Thr Arg Phe Glu Ile Glu Thr Leu Gln
210 215 220

Ser Arg Tyr Arg Ala Leu Gly Phe Arg Arg Val Trp Arg Asp Ala Gly
225 230 235 240

Lys Arg Ala Leu Ile His Val Ser Gly Asn Val Leu His Val Asp Ala
245 250 255

Ala Arg Thr Ala Tyr Arg Ala Arg Gly Gln Gln Ile Gly Trp Ala Val
260 265 270

Leu Asp Thr Gly Ile Ala Ala Ala His Pro His Phe Phe Val Pro Gly
275 280 285

Glu Arg Asp Asn Val Val Ala Gln Trp Asp Cys Thr Arg Arg Gly Ala
290 295 300

Pro Lys Arg Leu Thr Arg Ala Asp Gly Lys Arg Phe Thr Ala Leu Asp
305 310 315 320

Gly His Gly His Gly Thr His Ile Ala Gly Ile Ile Ala Gly Cys Cys
325 330 335

Arg Ala Ala Val Pro Asp Ala Ser Gly Lys Pro Gly Glu Leu Leu Glu
340 345 350

Phe Ala Gly Met Ala Pro Glu Thr Gln Leu Tyr Gly Phe Lys Val Leu
355 360 365

Asp Asp Ala Gly Asn Gly Arg Asp Ser Trp Met Ile Lys Ala Val Gln
370 375 380

His Val Ala Asp Leu Asn Glu Arg Ala Gly Glu Leu Val Ile His Gly
385 390 395 400

Val Asn Leu Ser Leu Gly Gly Tyr Phe Asp Pro Glu Ser Tyr Gly Cys
405 410 415

Gly Phe Thr Pro Leu Cys Asn Glu Leu Arg Arg Leu Trp Arg Gln Gly
420 425 430

Val Leu Val Val Val Ala Ala Gly Asn Glu Gly Leu Ala Trp Leu Met
435 440 445

Gln Asn Asp Gly Gly Thr Tyr Pro Ala Asn Met Asp Leu Ser Ile Ser
450 455 460

Asp Pro Gly Asn Leu Glu Asp Ala Ile Val Val Gly Ser Val His Lys
465 470 475 480

Ser Ser Pro His Asn Tyr Gly Val Ser Tyr Phe Ser Ser Arg Gly Pro
485 490 495

Thr Ala Asp Gly Arg Ser Lys Pro Asp Val Val Ala Pro Gly Glu Lys
500 505 510

Ile Leu Ser Ala Tyr Tyr Gly Phe Asp Pro Arg Asp Pro Ser Ser Leu
515 520 525

Met Val Glu Met Ser Gly Thr Ser Met Ala Ala Pro His Val Ser Gly
530 535 540

Val Leu Ala Gly Phe Leu Ser Ala Arg Arg Glu Phe Ile Gly Phe Pro
545 550 555 560

Asp Arg Val Lys Gln Leu Leu Leu Asp Thr Cys Thr Asp Leu Gln Arg
565 570 575

Asp Arg Tyr Val Gln Gly Arg Gly Val Pro Asn Leu Met Arg Met Leu
580 585 590

Gly Glu Thr
595

<210> 60
<211> 627
<212> PRT
<213> Xanthomonas campestris

<400> 60

Val Ile Asp Lys Asn Phe Arg Leu Asn Pro Leu Thr Gly Ala Ile Leu
1 5 10 15

Met Met Ala Leu Gly Ala Ser Gly Thr Leu Val Ala Ala Pro Ala Leu
20 25 30

Gln Val Lys Glu Pro Thr Gln Ala Ala Pro Ala Ala Ser Asp Phe Ser
35 40 45

Ser Arg Leu Ile Val Arg Tyr Lys Asp Gly Thr Ala Ala Ala Ser Asp
50 55 60

Arg Ser Ser Lys Leu Gly Val Val Gln Ser Ala Val Gly Arg Ala Ala
65 70 75 80

Pro Val Thr Gly Ala Arg Ala Gly Ala Thr Ala Ala Lys Ala Thr Tyr
85 90 95

Leu Arg Lys Leu Gly Ile Gly Ser Asp Leu Ile Lys Leu Ser Gly Thr
100 105 110

Leu Thr Ala Ala Gln Val Asp Lys Val Val Val Glu Leu Lys Asn Asp
115 120 125

Pro Ser Val Ala Glu Val Gln Ile Asp Arg Met Leu Arg Pro Val Glu
130 135 140

Ile Lys Lys Ser Val Ala Ala Thr Asp Val Ser Pro Gln Leu Val Pro
145 150 155 160

Asn Asp Pro Leu Tyr Ala Gln Tyr Gln Trp His Leu Ser Asn Pro Asn
165 170 175

Gly Gly Ile Asn Ala Pro Ala Ala Trp Asp Leu Ser Gln Gly Ala Gly
180 185 190

Val Val Val Ala Val Leu Asp Thr Gly Ile Leu Pro Gly His Pro Asp
195 200 205

Phe Ala Gly Asn Leu Leu Gln Gly Tyr Asp Phe Ile Thr Asp Ala Glu
210 215 220

Val Ser Arg Arg Pro Thr Asp Ala Arg Val Pro Gly Ala Leu Asp Tyr
225 230 235 240

Gly Asp Trp Glu Glu Ala Asp Asn Val Cys Tyr Asp Gly Ser Val Ala
245 250 255

Gln Glu Ser Ser Trp His Gly Thr His Val Ser Gly Thr Val Ala Glu
260 265 270

Ala Thr Asn Asn Gly Leu Gly Met Ala Gly Val Ala Pro Lys Ala Thr
275 280 285

Ile Leu Pro Val Arg Val Leu Gly Arg Cys Gly Gly Tyr Thr Ser Asp

290 295 300

Ile Ala Asp Ala Ile Val Trp Ala Ser Gly Gly Thr Val Asp Gly Val
305 310 315 320

Pro Ala Asn Thr Asn Pro Ala Glu Val Ile Asn Met Ser Leu Gly Gly
325 330 335

Gly Glu Pro Cys Asp Pro Ala Thr Gln Val Ala Ile Asn Gly Ala Val
340 345 350

Ser Arg Gly Thr Thr Val Val Val Ala Ala Gly Asn Ser Gly Glu Asp
355 360 365

Ala Ala Asn His Ser Pro Ala Ser Cys Asn Asn Thr Ile Thr Val Gly
370 375 380

Ala Thr Arg Ile Thr Gly Gly Ile Thr Tyr Tyr Ser Asn Tyr Gly Ser
385 390 395 400

Lys Val Asp Leu Ser Gly Pro Gly Gly Gly Gly Ser Val Asp Gly Asn
405 410 415

Pro Gly Gly Tyr Ile Trp Gln Ala Gly Tyr Asp Gly Ala Thr Thr Pro
420 425 430

Thr Ser Gly Ser Tyr Ser Tyr Met Gly Met Gly Gly Thr Ser Met Ala
435 440 445

Ser Pro His Val Ala Gly Val Val Ala Leu Val Gln Ser Ala Ser Ile
450 455 460

Gly Leu Gly Asp Gly Pro Leu Thr Pro Ala Ala Met Glu Ala Leu Leu
465 470 475 480

Lys Gln Ala Ser Arg Arg Phe Pro Val Thr Pro Pro Thr Ser Thr Pro
485 490 495

Ile Gly Ser Gly Ile Val Asp Ala Lys Ala Ala Leu Glu Ala Val Leu
500 505 510

Val Glu Pro Cys Asp Pro Asp Thr Glu Thr Cys Ala Pro Ala Ala Ile
515 520 525

Ala Leu Thr Asn Lys Ala Pro Leu Thr Gly Leu Ser Gly Glu Tyr Asn
530 535 540

Ser Ser Thr Leu Tyr Ser Phe Glu Ala Lys Ala Gly Ala Val Leu Ser
545 550 555 560

Phe Met Thr Tyr Gly Gly Thr Gly Asn Val Ser Val Tyr Val Ser Phe
565 570 575

Glu Ala Glu Pro Thr Ala Thr Asp Tyr Asp Ala Lys Ser Thr Arg Pro
580 585 590

Gly Asn Ser Glu Thr Val Arg Phe Thr Ala Pro Lys Ala Gly Thr Tyr

595 600 605

Tyr Ile Lys Leu Val Gly Ala Gly Asp Tyr Ala Lys Leu Thr Leu Val
610 615 620

Ala Arg Gln
625

<210> 61
<211> 959
<212> PRT
<213> Xanthomonas campestris

<400> 61

Met Leu Arg Pro Leu Ser Leu Leu Ile Ala Gly Val Leu Gly Val Ala
1 5 10 15

Ala Gly Thr Val Ala Pro Ala Ala Gln Ala Ala Pro Ala Ser Leu Ser
20 25 30

Lys Thr Ala Asn Ser Ser Ala Ile Pro Asp Ile Ala Tyr Thr Arg Phe
35 40 45

Thr Leu Pro Asn Gly Leu Thr Val Val Val His Glu Asp His Lys Ala
50 55 60

Pro Val Val Ala Val Ser Ile Trp Tyr His Ile Gly Ser Gly Asp Glu
65 70 75 80

Pro Ala Gly Lys Thr Gly Phe Ala His Leu Phe Glu His Leu Met Phe
85 90 95

Ser Gly Ser Glu Asn Asn Lys Gly Ser Phe Phe Ala Pro Leu Glu Lys
100 105 110

Val Gly Thr Thr Asp Met Asn Gly Thr Thr Trp Phe Asp Arg Thr Asn
115 120 125

Tyr Phe Glu Thr Val Pro Thr Thr Ala Leu Asp Thr Ala Leu Trp Leu
130 135 140

Glu Ser Asp Arg Met Gly His Leu Leu Gly Ala Ile Gly Gln Glu Glu
145 150 155 160

Leu Asp Thr Gln Arg Gly Val Val Gln Asn Glu Lys Arg Gln Gly Glu
165 170 175

Asn Arg Pro Tyr Gly Arg Val Asp Gln Asn Ile Leu Ser Asn Leu Phe
180 185 190

Pro Ala Asn His Pro Tyr Gln His Asp Thr Ile Gly Ser Met Glu Asp
195 200 205

Leu Asp Ala Ala Ser Leu Ala Asp Val Lys Gln Trp Phe Asn Asp Asn
210 215 220

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Tyr Gly Ala Ala Asn Thr Thr Leu Val Leu Ala Gly Asp Ile Thr Val
225                 230                 235                 240

Ala Gln Ala Arg Ala Lys Ala Glu Gln Tyr Phe Gly Asp Ile Pro Ser
                245                 250                 255

Gly Lys Pro Val Ala Arg Gln Gln Pro Trp Val Thr Pro Leu Ala Ala
            260                 265                 270

Gln Lys Arg Gly Val Gln His Asp His Val Ser Gln Pro Arg Ile Tyr
        275                 280                 285

Arg Thr Trp Ala Ala Pro Gln Leu Gly Thr Asp Asp Met Ile Gln Leu
    290                 295                 300

Asp Leu Ala Thr Thr Val Leu Gly Gly Gly Lys Thr Ser Arg Leu Tyr
305                 310                 315                 320

Gln Arg Leu Val Tyr Gln Asp Gln Leu Val Asp Asp Val Ser Ala Ser
                325                 330                 335

Ile Gln Pro Phe Ala Leu Ala Ser Gln Met Gln Ile Gln Ala Asp Val
            340                 345                 350

Lys Asp Gly Val Asp Pro Ala Lys Val Glu Ala Ile Ile Asp Glu Glu
        355                 360                 365

Leu Lys Lys Phe Leu Ala Glu Gly Pro Thr Ala Asp Glu Leu Gln Arg
    370                 375                 380

Ala Gln Val Ala Tyr Arg Ala Gly Phe Val Arg Gly Leu Glu Lys Val
385                 390                 395                 400

Gly Gly Phe Gly Gly Lys Ala Val Ile Leu Ala Glu Gly Gln Val Tyr
                405                 410                 415

Arg Gly Asp Pro Gly Ala Tyr Lys Gln Asp Leu Gln Arg Gly Gln Ala
            420                 425                 430

Ala Thr Ile Gly Ser Val Lys Gln Ala Ala Ser Thr Trp Phe Gly Lys
        435                 440                 445

Gly Asp Tyr Leu Leu Thr Val Leu Pro Ala Gly Lys Asp Phe Asp Pro
    450                 455                 460

Ala Ala Glu Asp Lys Ala Val Val Ala Arg Gly Thr Glu Pro Gly Lys
465                 470                 475                 480

Pro Ala Pro Lys Leu Pro Ala Ala Ala Lys Tyr Lys Val Thr Ala Ser
                485                 490                 495

Lys Leu Asp Arg Ser Lys Gly Val Pro Asp Thr Ala Ser Phe Pro Asp
            500                 505                 510

Leu Ser Phe Pro Gln Leu Gln Arg Gly Lys Leu Lys Asn Gly Val Glu
        515                 520                 525
```

Val Ile Leu Ala Glu Arg His Thr Ile Pro Val Thr Gln Val Glu Leu
530 535 540

Leu Phe Asp Ala Gly Tyr Ala Ala Asp Gln Gly Lys Lys Leu Gly Thr
545 550 555 560

Ala Ser Phe Ser Ala Ala Leu Met Asn Glu Ser Thr Ala Ser Leu Asp
565 570 575

Ser Val Glu Val Ala Gln Arg Arg Gln Arg Leu Gly Ala Ile Thr Glu
580 585 590

Val Gly Cys Asp Leu Asp Ser Cys Ser Ala Ser Leu Asn Ala Leu Asn
595 600 605

Asp Gln Leu Gln Pro Ser Leu Gln Leu Phe Ser Asp Ile Val Arg Asn
610 615 620

Pro Ala Phe Lys Ala Ala Asp Ile Glu Arg Ile Arg Gly Gln Trp Leu
625 630 635 640

Ala Gly Ile Ala Gln Glu Lys Thr Gln Pro Asn Ser Leu Gly Leu Arg
645 650 655

Ala Leu Pro Pro Leu Met Tyr Gly Asp Lys His Pro Tyr Gly Ile Pro
660 665 670

Leu Thr Gly Ser Gly Thr Glu Ala Ala Ile Lys Ser Leu Asn Ala Lys
675 680 685

Asp Leu Gln Ala Phe His Asn Gln Trp Leu Arg Pro Asp Asn Leu Arg
690 695 700

Ile Leu Val Ala Gly Asp Thr Thr Leu Ala Gln Ile Ile Pro Gln Leu
705 710 715 720

Asp Ala Ala Phe Gly Asp Trp Thr Ala Pro Ala Ala Pro Leu Pro Lys
725 730 735

Lys Asn Leu Val Asn Val Ala Ala Gln Pro Lys Pro Arg Val Tyr Leu
740 745 750

Ile Asn Arg Pro Asp Ala Pro Gln Ser Val Ile Leu Ala Gly Leu Leu
755 760 765

Ala Pro Ser Thr Lys Ala Pro Asp Asn Leu Ala Ile Thr Val Ala Asn
770 775 780

Gly Ala Phe Gly Gly Thr Phe Thr Ser Arg Leu Asn Met Asn Leu Arg
785 790 795 800

Glu Asn Lys Arg Trp Ala Tyr Gly Ala Arg Thr Gln Leu Val Asp Ala
805 810 815

Gln Gly Gln Arg Pro Tyr Met Phe Ala Ala Pro Val Gln Thr Asp Lys
820 825 830

Thr Ala Glu Ser Ala Asn Glu Ile Phe Lys Glu Ala Thr Ala Ile Ile
835 840 845

Gly Asp Lys Pro Leu Thr Thr Glu Glu Ile Glu Lys Ile Lys Asn Gln
850 855 860

Arg Ile Arg Ala Leu Pro Gly Ser Phe Glu Thr Thr Gly Ala Val Leu
865 870 875 880

Gly Ala Ile Glu Gly Ile Val Gln Phe Asp Arg Pro Asp Asn Tyr Val
885 890 895

Gln Thr Leu Lys Pro Arg Leu Glu Ala Ile Asp Gln Pro Ala Ala Gln
900 905 910

Ala Ala Ile Lys Asp Ile Ile Ala Pro Asn Ala Met Thr Trp Val Ile
915 920 925

Val Gly Asp Leu Lys Lys Ile Glu Ala Pro Val Arg Ala Leu Lys Leu
930 935 940

Gly Glu Val Gln Val Leu Asp Thr Asp Gly Lys Pro Val Lys Arg
945 950 955

<210> 62
<211> 428
<212> PRT
<213> Xanthomonas campestris

<400> 62

Met Ser Glu Asp Arg Gln Gly Arg Ser Gly Asp Ser Asn Lys Ile Leu
1 5 10 15

Tyr Cys Ser Phe Cys Gly Lys Ser Gln His Glu Val Arg Lys Leu Ile
20 25 30

Ala Gly Pro Ser Val Phe Ile Cys Asp Glu Cys Val Glu Leu Cys Asn
35 40 45

Asp Ile Ile Arg Glu Glu Leu Glu Glu Lys Ala Gln Ser Ala Arg Ser
50 55 60

Ser Leu Pro Lys Pro Arg Glu Ile Leu Glu Val Leu Asp Gln Tyr Val
65 70 75 80

Ile Gly Gln Leu Arg Ala Lys Arg Thr Leu Ala Val Ala Val Tyr Asn
85 90 95

His Tyr Lys Arg Ile Glu Ser Arg Ser Lys Asn Asp Glu Val Glu Leu
100 105 110

Ala Lys Ser Asn Ile Leu Leu Val Gly Pro Thr Gly Ser Gly Lys Thr
115 120 125

```
Leu Leu Ala Glu Thr Leu Ala Arg Leu Leu Asn Val Pro Phe Thr Ile
    130                 135                 140

Ala Asp Ala Thr Thr Leu Thr Glu Ala Gly Tyr Val Gly Glu Asp Val
145                 150                 155                 160

Glu Asn Ile Ile Gln Lys Leu Leu Gln Lys Cys Asp Tyr Asp Val Glu
                165                 170                 175

Lys Ala Gln Gln Gly Ile Val Tyr Ile Asp Glu Ile Asp Lys Ile Ser
            180                 185                 190

Arg Lys Ser Glu Asn Pro Ser Ile Thr Arg Asp Val Ser Gly Glu Gly
        195                 200                 205

Val Gln Gln Ala Leu Leu Lys Leu Ile Glu Gly Thr Val Ala Ser Val
    210                 215                 220

Pro Pro Gln Gly Gly Arg Lys His Pro Gln Gln Glu Phe Leu Gln Val
225                 230                 235                 240

Asp Thr Lys Asn Ile Leu Phe Ile Cys Gly Gly Ala Phe Ala Gly Leu
                245                 250                 255

Asp Lys Val Ile Gln Ala Arg Ser Asn Asp Ala Gly Gly Ile Gly Phe
            260                 265                 270

Gly Ala Lys Val Lys Ser Ser Glu Arg Lys Gln Glu Val Gly Lys Ile
        275                 280                 285

Leu Ala Glu Val Glu Pro Glu Asp Leu Ile Lys Phe Gly Leu Ile Pro
    290                 295                 300

Glu Phe Val Gly Arg Leu Pro Val Val Ala Thr Leu Glu Glu Leu Asp
305                 310                 315                 320

Glu Pro Ala Leu Ile Lys Ile Leu Thr Glu Pro Lys Asn Ala Ile Thr
                325                 330                 335

Lys Gln Phe Lys Lys Leu Phe Glu Met Glu Ser Val Glu Leu Glu Phe
            340                 345                 350

Arg Pro Asp Ala Leu Ser Ala Ile Ala Lys Lys Ala Leu Lys Arg Lys
        355                 360                 365

Thr Gly Ala Arg Gly Leu Arg Thr Ile Val Glu Ser Val Leu Leu Asp
    370                 375                 380

Thr Met Tyr Glu Leu Pro Ser Gln Glu Asn Val Ser Lys Val Val Val
385                 390                 395                 400

Asp Glu Ser Val Ile Glu His Lys Ser Glu Pro Tyr Leu Ile Tyr Gln
                405                 410                 415

Ala Gln Pro Ala Pro Ala Lys Ala Ala Ser Gly Asp
            420                 425
```

<210> 63
<211> 205
<212> PRT
<213> Xanthomonas campestris

<400> 63

Val Thr Lys Ala Leu Asn Leu Val Pro Met Val Val Glu Gln Thr Ser
1 5 10 15

Arg Gly Glu Arg Ala Tyr Asp Ile Tyr Ser Arg Leu Leu Lys Glu Arg
20 25 30

Leu Ile Phe Leu Val Gly Pro Ile Asp Asp His Met Ala Asn Val Ile
35 40 45

Val Ala Gln Leu Leu Phe Leu Glu Ala Asp Asn Pro Glu Lys Asp Ile
50 55 60

Ser Ile Tyr Ile Asn Ser Pro Gly Gly Val Val Thr Ala Gly Met Ala
65 70 75 80

Ile Tyr Asp Thr Met Gln Tyr Ile Lys Pro Asp Val Ser Thr Ile Cys
85 90 95

Val Gly Gln Ala Ala Ser Met Gly Ala Leu Leu Leu Ala Ser Gly Ala
100 105 110

Ala Gly Lys Arg Tyr Ala Leu Pro Asn Ser Arg Val Met Ile His Gln
115 120 125

Pro Leu Gly Gly Phe Gln Gly Gln Ala Thr Asp Ile Asp Ile His Ala
130 135 140

Arg Glu Ile Leu Thr Leu Arg Ser Arg Leu Asn Glu Ile Leu Ala Lys
145 150 155 160

His Thr Gly Gln Ser Leu Glu Thr Ile Ala Arg Asp Thr Glu Arg Asp
165 170 175

Asn Phe Lys Ser Ala Val Asp Ala Gln Ala Tyr Gly Leu Val Asp Gln
180 185 190

Val Leu Glu Arg Arg Pro Glu Glu Ser Ile Gln Pro Ser
195 200 205

<210> 64
<211> 191
<212> PRT
<213> Xanthomonas campestris

<400> 64

Val Gln Ala Pro Leu Gln Ile Glu Glu Phe Leu Met Thr His Ser Leu
1 5 10 15

Ser Gly Lys Thr Val Ala Val Leu Ala Thr Ser Gly Phe Glu Gln Ser
20 25 30

Glu Leu Gln Glu Pro Lys Arg Leu Leu Glu Ser Trp Gly Ala Thr Val
35 40 45

Glu Val Ile Ala Pro Gly Asp Asp Ala Gln Ile Arg Gly Trp Asn His
50 55 60

Thr Asp Trp Gly Asp Ser Val Pro Val Asp Thr Pro Leu Ala Gln Ala
65 70 75 80

Lys Pro Asp Arg Tyr Asp Ala Leu Val Leu Pro Gly Gly Val Ile Asn
85 90 95

Pro Asp Asn Leu Arg Thr Asn Ala Gln Ala Ile Asp Phe Ile Arg Ser
100 105 110

Val Ala Ala Ser Gly Lys Pro Val Ala Ala Ile Cys His Gly Pro Trp
115 120 125

Leu Leu Val Glu Ser Gly Leu Val Arg Asp Arg Lys Val Thr Ser Trp
130 135 140

Pro Ser Val Lys Thr Asp Leu Ser Asn Ala Gly Gly Arg Trp Glu Asp
145 150 155 160

Ala Glu Val Val Val Asp Gly Gln Leu Ile Thr Ser Arg Lys Pro Asp
165 170 175

Asp Ile Pro Ala Phe Thr Asp Ala Val Ala Lys Ala Leu Ala Ala
180 185 190

<210> 65
<211> 658
<212> PRT
<213> Xanthomonas campestris

<400> 65

Met Phe Ser Lys Asp Leu Glu Gln Thr Ile Gly Gln Cys Tyr Lys Arg
1 5 10 15

Ala Arg Glu Ala Arg His Glu Phe Met Thr Val Glu His Leu Leu Leu
20 25 30

Ser Leu Leu Asp Asn Pro Ser Ala Gln Ala Val Leu Lys Ala Cys Gly
35 40 45

Ala Asp Gln Val Arg Leu His Thr Asp Leu Glu Gln Ala Ile Glu Ala
50 55 60

Ser Val Ser Arg Leu Ala Glu Asp Asp Gly Arg Asp Thr Gln Pro Thr
65 70 75 80

Leu Gly Phe Gln Arg Val Leu Gln Arg Ala Val Tyr His Val Gln Ser
85 90 95

Ser Gly Lys Lys Glu Val Thr Gly Ala Asn Val Leu Val Ala Ile Phe
100 105 110

Gly Glu Lys Asp Ser His Ala Val Tyr Phe Leu Asn Gln Gln Asp Ile
115 120 125

Thr Arg Leu Asp Ile Val Asn Tyr Leu Ser His Gly Ile Ala Lys Leu
130 135 140

Gly Glu Asp Gly Glu Gln Pro Ser Ala Ser Asp Gly Glu Pro Lys Ser
145 150 155 160

Asp Ala Gly Glu Gly Glu Gly Lys Gly Asp Ala Leu Ala Glu Tyr Ala
165 170 175

Thr Asn Leu Asn Asp His Ala Arg Asn Gly Lys Ile Asp Pro Leu Val
180 185 190

Gly Arg Ala Asp Glu Ile Glu Arg Thr Ile Gln Val Leu Cys Arg Arg
195 200 205

Arg Lys Asn Asn Pro Leu Tyr Val Gly Glu Ala Gly Val Gly Lys Thr
210 215 220

Ala Ile Ala Glu Gly Leu Ala Lys Arg Ile Val Asp Ala Asp Val Pro
225 230 235 240

Glu Val Leu Ala Asp Ala Val Ile Phe Ser Leu Asp Leu Gly Ala Leu
245 250 255

Val Ala Gly Thr Lys Tyr Arg Gly Asp Phe Glu Lys Arg Leu Lys Gly
260 265 270

Val Leu Thr Ala Leu Lys Lys Val Pro Asn Ala Val Leu Phe Ile Asp
275 280 285

Glu Ile His Thr Ile Ile Gly Ala Gly Ser Ala Ser Gly Gly Thr Met
290 295 300

Asp Ala Ser Asn Leu Ile Lys Pro Ala Leu Ala Ser Gly Glu Leu Arg
305 310 315 320

Cys Ile Gly Ser Thr Thr Phe Gln Glu Tyr Arg Gly Ile Phe Glu Lys
325 330 335

Asp Arg Ala Leu Ala Arg Arg Phe Gln Lys Ile Asp Ile Val Glu Pro
340 345 350

Thr Val Gly Glu Thr Phe Glu Ile Leu Gln Gly Leu Lys Pro Lys Tyr
355 360 365

Glu Ala His His Gly Val Thr Tyr Ala Asp Asp Ala Leu Gln Ala Ala
370 375 380

Val Asp Leu Ser Val Lys His Ile Gly Asp Arg Leu Leu Pro Asp Lys
385 390 395 400

Ala Ile Asp Val Ile Asp Glu Ala Gly Ala Arg Gln Arg Leu Leu Pro
405 410 415

Glu Gly Gln Arg Lys Glu Leu Ile Asp Ile Glu Glu Ile Glu Thr Ile
420 425 430

Val Ala Gln Asp Gly Ala Tyr Ser Gly Gln Ala Gly Gln Arg Asp Arg
435 440 445

Gln Gly Arg Ala Ala Ala Ser Gly Thr Gln Ser Gln Asp Gly Asp Leu
450 455 460

Arg Ala Glu Pro Gly Asp Arg Asn Ala Gly Trp Leu Asp Gln Ala Gly
465 470 475 480

Ala Leu Gly Pro Gly Gln Ser Gly Glu Ala Asp Arg Gln Leu Pro Val
485 490 495

Arg Trp Pro Asp Arg Cys Gly Gln Asp Arg Gly His Gln Ala Ala Arg
500 505 510

Ala Ala Ile Gly His Arg Ala Gly Ala Val Arg His Val Arg Val His
515 520 525

Gly Ser Ala Phe Asp Gln Pro Ser Asp Arg Cys Ala Ser Gly Leu Cys
530 535 540

Arg Phe Arg Ser Gly Arg Ser Ala Asp Arg Lys Asp Arg Gln Asp Ala
545 550 555 560

Ala Leu Arg Ala Ala Ala Gly Arg Gly Gly Glu Gly Ala Ser Gly His
565 570 575

Leu Gln His Pro Val Ala Gly His Gly Pro Arg His Pro His Arg Tyr
580 585 590

Gln Arg Ala Arg Ser Glu Leu Gln Glu Arg Asp Pro Gly Asp Asp Asp
595 600 605

Gln Arg Arg Cys His Ala Gly Leu Ala Ser Phe Asp Arg Phe His Gln
610 615 620

Ala Gly Ser Phe His Arg Cys Asp Gly Ile Asp Pro Pro Arg Phe His
625 630 635 640

Ala Gly Val Pro Gln Pro Ser Gly Cys Asp Arg Ala Val Pro Ala Ala
645 650 655

Gly Leu

<210> 66
<211> 325
<212> PRT

<213> Xanthomonas campestris

<400> 66

```
Met Ala Arg Ile Pro Ala Lys Gln Val Ser Ala Thr Asp Lys Asp Val
1               5                  10                  15

Leu Gln His Leu Glu Arg Asn Leu Lys Met Val Ile Phe Gly Gln Asn
            20                  25                  30

Pro Ala Ile Glu Thr Leu Ala Gly Ser Ile Lys Leu Ala Arg Ser Gly
        35                  40                  45

Leu Ala Asn Pro Glu Lys Pro Ile Gly Asn Phe Leu Phe Ala Gly Pro
    50                  55                  60

Thr Gly Val Gly Lys Thr Glu Val Thr Lys Gln Leu Ala Leu Gln Leu
65                  70                  75                  80

Gly Ile Glu Leu Val Arg Phe Asp Met Ser Glu Tyr Met Glu Ala His
                85                  90                  95

Ser Ile Ser Arg Leu Ile Gly Ala Pro Pro Gly Tyr Val Gly Phe Asp
            100                 105                 110

Gln Gly Gly Leu Leu Thr Glu Lys Ile Val Lys Thr Pro His Cys Val
        115                 120                 125

Leu Leu Leu Asp Glu Val Glu Lys Ala His Pro Asp Ile Phe Asn Ile
    130                 135                 140

Leu Leu Gln Val Met Asp Arg Gly Ile Leu Thr Asp Thr Asn Gly Arg
145                 150                 155                 160

Glu Ala Asn Phe Lys Asn Val Ile Leu Val Met Thr Thr Asn Ala Gly
                165                 170                 175

Ala Thr Gln Ala Ser Arg Arg Ser Ile Gly Phe Thr Lys Gln Asp His
            180                 185                 190

Ser Thr Asp Ala Met Glu Ser Ile Arg Arg Gly Phe Thr Pro Glu Phe
        195                 200                 205

Arg Asn Arg Leu Asp Ala Ile Val Gln Phe Gln Pro Leu Gly Phe Asp
    210                 215                 220

His Ile Leu Arg Val Val Asp Lys Phe Ile Ile Glu Leu Glu Met Leu
225                 230                 235                 240

Leu Gln Glu Lys His Val Ser Leu Ser Ala Thr Pro Thr Ala Arg Asp
                245                 250                 255

Trp Leu Ala Gln His Gly Phe Asp Pro Leu Met Gly Ala Arg Pro Met
            260                 265                 270

Ser Arg Val Ile Gln Glu Lys Ile Lys Arg Pro Leu Ala Asp Glu Leu
        275                 280                 285
```

```
Leu Phe Gly Lys Leu Val Glu Gly Gly Arg Val Asn Ile Asp Val Lys
    290                 295                 300

Asp Gly Glu Leu Val Val Glu Ala His Pro Glu Pro Glu Arg Leu Leu
305                 310                 315                 320

Pro Ala Thr Val Asp
                325
```

<210> 67
<211> 450
<212> PRT
<213> Xanthomonas campestris

<400> 67

```
Val Pro Leu Asp Glu Ile Arg Arg Phe Val Ala Val Tyr Asn Ala Val
1               5                   10                  15

Lys Gln Ala Tyr Val Asp Pro Val Glu Asp Lys Lys Leu Met His Ala
            20                  25                  30

Ala Val Arg Gly Leu Leu Ser Asp Leu Asp Pro His Ser Thr Tyr Phe
        35                  40                  45

Asp Lys Glu Asp Ala Glu Ala Phe Asp Glu Gln Ala Thr Gly Ala Tyr
    50                  55                  60

Asp Gly Ile Gly Val Glu Leu Leu Gln Gln Gln Asp Asn Thr Leu Lys
65                  70                  75                  80

Val Ile Ala Pro Ile Asp Asp Thr Pro Ala Ala Arg Ala Gly Val Lys
                85                  90                  95

Ala Gly Asp Val Ile Val Ala Ile Asp Gly Lys Pro Ile Asp Ala Ser
            100                 105                 110

Lys Ala Met Glu Pro Leu Arg Gly Glu Ser Gly Ser Lys Val Thr Leu
        115                 120                 125

Thr Ile Val Arg Asp Lys Val Ala Lys Pro Phe Asp Ile Thr Leu Gln
    130                 135                 140

Arg Glu Thr Ile Arg Val Ala Ser Val Arg Ser Lys Leu Leu Glu Pro
145                 150                 155                 160

Gly Tyr Gly Tyr Ile Arg Ile Ser Thr Phe Gln Ala Asp Thr Gly Ala
                165                 170                 175

Asp Phe Gln Lys Asn Leu Lys Gln Leu Gln Ala Gly Gly Lys Leu Arg
            180                 185                 190

Gly Leu Val Leu Asp Leu Arg Ser Asn Pro Gly Gly Leu Leu Thr Ser
        195                 200                 205
```

```
Ala Val Gln Val Ala Asp Asp Leu Leu Asp Lys Gly Asn Ile Val Ser
    210                 215                 220

Thr Arg Gly Arg Ile Ser Ile Ser Asp Ala Lys Phe Asp Ala Thr Pro
225                 230                 235                 240

Gly Asp Leu Leu Gly Gly Ala Pro Val Val Val Leu Val Asp Ala Gly
                245                 250                 255

Ser Ala Ser Ala Ser Glu Val Leu Ala Gly Ala Leu Arg Asp Asn Gln
            260                 265                 270

Arg Ala Arg Ile Ile Gly Ser Arg Thr Phe Gly Lys Gly Ser Val Gln
        275                 280                 285

Thr Val Leu Pro Leu Asp Asn Gly Asp Ser Val Lys Leu Thr Thr Ala
    290                 295                 300

Arg Tyr Tyr Thr Pro Ser Gly Lys Ser Ile Gln Ala Ser Gly Ile Val
305                 310                 315                 320

Pro Glu Val Met Leu Thr Pro Glu Pro Gln Pro Gly Asp Ala Asp Val
                325                 330                 335

Pro Ala Ser Leu Thr Asp Phe Ser Glu Ala Thr Leu Pro Gly His Leu
            340                 345                 350

Arg Gly Asp Ala Glu Gly Glu Glu Gly Tyr Ser Ala Gly Asp Val Leu
        355                 360                 365

Pro Gly Asp Gly Pro Ile Asn Glu Ala Leu Ala Glu Leu Lys Gln Pro
    370                 375                 380

Gly Ser Val Ala Lys Ala Gln Ala Ala Arg Lys Ala Lys Ala Gln Ala
385                 390                 395                 400

Gln Lys Pro Lys Ala Ile Lys Pro Thr Pro Glu Pro Lys Pro Ala Ala
                405                 410                 415

Pro Arg Pro Pro Ala Ser Glu Gln Thr Thr Pro Ala Glu Pro Thr Asp
            420                 425                 430

Lys Ala Lys Pro Ala Ala Pro Val Pro Ala Ala Val Pro Ala Glu Pro
        435                 440                 445

Val Lys
    450
```

<210> 68
<211> 727
<212> PRT
<213> Xanthomonas campestris

<400> 68

```
Met Thr Tyr Asn Val Ser Ala Ser Leu Lys Ala Gly Leu Leu Ala Leu
```

```
1               5                   10                  15

Val Leu Thr Thr Pro Met Ala Leu Leu Ala Arg Ala Asp Thr Ala Leu
            20                  25                  30

Pro Ala Ala Ala Thr Pro Glu Gln Ala Thr Ala Thr Lys Leu Val Tyr
        35                  40                  45

Gly Leu Leu Ser Asp Ser Arg Tyr Ala Tyr Arg Pro Arg Thr Leu Asp
    50                  55                  60

Glu Ala Met Ser Lys Asp Val Phe Lys Arg Tyr Leu Glu Thr Leu Asp
65                  70                  75                  80

Gly Gly Lys Gln Phe Phe Thr Gln Ala Asp Val Asp Ala Phe Ala Pro
                85                  90                  95

Leu Gln Ala Gly Val Gly Asp Ala Leu Arg Gly Gly Asn Leu Glu Pro
            100                 105                 110

Ala Phe Gln Val Phe Ser Val Tyr Lys Lys Arg Val Asp Gln Arg Val
        115                 120                 125

Lys Tyr Ala Arg Glu Leu Leu Lys Gln Asp Phe Asp Phe Thr Gly Ser
    130                 135                 140

Glu Lys Phe Glu Tyr Asp Arg Lys Asp Val Pro Trp Ala Ala Asp Asp
145                 150                 155                 160

Lys Gln Leu Asp Val Leu Trp Arg Gln Ser Val Met Asn Asp Trp Leu
                165                 170                 175

Arg Leu Lys Leu Ala Gly Lys Lys Ser Asp Asp Ile Arg Lys Thr Leu
            180                 185                 190

Asp Lys Arg Tyr Ala Thr Leu Ala Asp Ser Val Asn Glu Leu Lys Ala
        195                 200                 205

Glu Asp Ala Phe Gln Phe Phe Leu Asn Ala Tyr Thr Asn Ala Val Asp
    210                 215                 220

Pro His Thr Asp Tyr Phe Thr Pro Arg Thr Ala Glu Asn Phe Asn Gln
225                 230                 235                 240

Gln Met Ser Leu Ser Leu Glu Gly Ile Gly Ala Gln Leu Gln Lys Gln
                245                 250                 255

Asp Asp Met Val Val Ile Arg Glu Val Ile Pro Gly Gly Pro Ala Ala
            260                 265                 270

Val Asp Gly Thr Leu Lys Pro Gly Asp Arg Ile Val Gly Val Gly Gln
        275                 280                 285

Thr Lys Ser Gly Ala Ile Glu Asp Val Ile Gly Trp Arg Ile Asp Asp
    290                 295                 300

Val Val Ala Lys Ile Arg Gly Ser Lys Asp Thr Gln Val Arg Leu Glu
```

305 310 315 320

Tyr Ile Pro Ala Glu Leu Gly Ile Asp Gly Thr His Arg Thr Val Thr
325 330 335

Leu Thr Arg Gln Lys Val Arg Leu Ala Glu Gln Ala Ala Lys Gly Glu
340 345 350

Thr Ile Thr Leu Pro Ala Ser Gly Asp Val Pro Gln Arg Arg Ile Gly
355 360 365

Ile Ile Lys Leu Pro Gly Phe Tyr Gln Asp Phe Glu Gly Arg Arg Arg
370 375 380

Asn Ala Ala Asp Tyr Ala Ser Ala Thr Arg Asp Val Ala Lys Leu Leu
385 390 395 400

Ala Gly Phe Lys Ser Asp Lys Val Asp Gly Val Val Leu Asp Leu Arg
405 410 415

Asn Asn Gly Gly Gly Ser Leu Asp Glu Ala Ile Glu Leu Thr Gly Leu
420 425 430

Phe Ile Glu Gln Gly Pro Val Val Gln Val Arg Glu Ser Gly Gly Arg
435 440 445

Val Thr Val Asn Gly Asp Ser Asn Pro Lys Val Ala Trp Asp Gly Pro
450 455 460

Leu Gly Val Leu Ile Asn Arg Gly Ser Ala Ser Ala Ser Glu Ile Phe
465 470 475 480

Ala Gly Ala Ile Gln Asp Tyr Gly Arg Gly Leu Val Ile Gly Glu Thr
485 490 495

Thr Phe Gly Lys Gly Thr Val Gln Asn Ile Val Asp Leu Asp Arg Trp
500 505 510

Pro Ala Ala Glu Gly Gln Arg Tyr Gly Gln Val Lys Leu Thr Ile Ala
515 520 525

Gln Phe Phe Arg Val Ser Gly Ser Ser Thr Gln His Lys Gly Val Val
530 535 540

Pro Asp Ile Ala Phe Pro Ala Ser Val Asp Ala Thr Glu Phe Gly Glu
545 550 555 560

Ser Thr Tyr Asp Asn Ala Leu Pro Trp Thr Arg Ile Ala Ala Val Pro
565 570 575

His Thr Gln Tyr Gly Asn Phe Ala Pro Leu Leu Pro Lys Leu Gln Thr
580 585 590

Leu His Ala Thr Arg Ile Ala Ser Asp Lys Glu Phe Gln Trp Trp Glu
595 600 605

Glu Asp Val Lys Gln Phe Arg Asp Glu Lys Ala Lys Lys Tyr Ile Ser

610 615 620

Leu Asn Glu Ala Glu Arg Val Ala Glu Arg Gln Lys Gln Asp Gln Gln
625 630 635 640

Arg Lys Asp Arg Gln Gln Val Arg Lys Gln Leu Gly Leu Pro Leu Asp
645 650 655

Pro Leu Ala Asp Asp Ser Asp Asp Gly Leu Thr Gly Asn Glu Arg Asp
660 665 670

Ile Val Lys Asp Thr Ala Arg Glu Lys Ala Ala Glu Lys Arg Pro Asp
675 680 685

Pro Leu Leu His Glu Ser Ala Ala Ile Leu Ala Asp Ala Leu Gly Leu
690 695 700

Leu Ser Lys Asp Gln Pro Leu Ser Ala Gln Val Leu Pro Gln Ser Thr
705 710 715 720

Ala Pro Gly Arg Trp Ala Asp
725

<210> 69
<211> 803
<212> PRT
<213> Xanthomonas campestris

<400> 69

Val Ile Val Leu Leu Gly Leu Val Leu Leu Ala Gly Gly Ala Trp Leu
1 5 10 15

Ala Thr Leu Gly Gly Ser Trp Tyr Tyr Ala Pro Ala Gly Leu Ala Met
20 25 30

Leu Ile Ala Gly Val Leu Leu Phe Arg Gly Arg Asn Ala Gly Ala Trp
35 40 45

Trp Phe Ala Ala Val Val Ala Ala Thr Leu Leu Trp Thr Trp Trp Glu
50 55 60

Ser Gly Ser Asp Tyr Trp Arg Trp Val Pro Arg Leu Gly Leu Ile Val
65 70 75 80

Gly Leu Ala Phe Val Leu Ala Leu Leu Leu Pro Lys Leu Glu Arg Pro
85 90 95

Val Ser Arg Ala Val Ser Arg Ser Val Ala Gly Gly Leu Ala Val Val
100 105 110

Phe Val Val Ala Phe Ala Leu Ala Phe Val Pro Phe Gly Ile Thr Glu
115 120 125

Ala Glu Gly Ala Leu Thr Gln Val Ala Gly Ile Ala Ala Gly Val Val
130 135 140

```
Asn Arg Pro Ala Asp Gly Ala Gln Pro Ala Gln Pro Ala Asn Ala Pro
145                 150                 155                 160

Val Asp Asp Asp Trp Ala Ala Tyr Gly Arg Ser Gln Ala Gly Gln Arg
                165                 170                 175

Tyr Ser Pro Leu Thr Gln Ile Asn Arg Asp Asn Val Ser Gln Leu Gln
            180                 185                 190

Gln Ala Trp Val Phe His Thr Gly Asp Val Pro Thr Lys Arg Trp Gly
        195                 200                 205

Ala Glu Thr Thr Pro Leu Lys Val Gly Asp Ser Leu Tyr Leu Cys Ser
    210                 215                 220

Ala Arg Asn Gln Val Ile Ala Leu Asp Ala Ser Thr Gly Lys Gln Arg
225                 230                 235                 240

Trp Arg Tyr Asp Pro Lys Val Lys Asp Glu Ala Ile Pro Tyr Thr Ala
                245                 250                 255

Ala Cys Arg Gly Val Ser Tyr Tyr Glu Val Pro Thr Ala Ala Pro Ala
            260                 265                 270

Ala Asn Asp Ala Ala Ala Ser Gln Ala Ala Thr Ala Pro Ala Leu Cys
        275                 280                 285

Arg Thr Arg Val Ile Glu Gly Thr Leu Asp Gly Arg Leu Ile Ala Leu
    290                 295                 300

Asp Ala Arg Thr Gly Thr Pro Cys Ala Asp Phe Gly Thr His Gly Gln
305                 310                 315                 320

Val Asp Ile Thr Val Gly Met Gly Glu Thr Pro Pro Gly Tyr Ile Ser
                325                 330                 335

Ile Asn Ser Pro Pro Ala Ile Val Arg Gly Val Val Val Ile Gly His
            340                 345                 350

Gln Val Leu Asp Gly Gln Lys Arg Tyr Glu Pro Ser Gly Val Ile Gln
        355                 360                 365

Gly Phe Asp Ala Val Thr Gly Gln Leu Arg Trp Ala Trp Asp Met Thr
    370                 375                 380

His Pro Glu Trp Asn Gly Ala Pro Pro Pro Gly Gln Thr Trp Thr Arg
385                 390                 395                 400

Gly Thr Pro Asn Met Trp Thr Thr Ala Ala Ala Asp Glu Gln Leu Gly
                405                 410                 415

Tyr Val Tyr Leu Pro Met Gly Asn Ser Thr Ala Asp Tyr Trp Ser Ser
            420                 425                 430

Ser Arg Thr Pro Pro Glu Asn Arg Tyr Ala Thr Ser Leu Val Ala Leu
        435                 440                 445
```

Asp Val Thr Thr Gly Lys Pro Val Trp Asn Phe Gln Thr Thr His Ile
450 455 460

Asp Ala Trp Asp Tyr Asp Leu Gly Ser Gln Pro Ser Leu Ile Asp Phe
465 470 475 480

Pro Lys Asp Gly Val Asn Val Pro Ala Val Leu Leu Pro Ser Lys Gln
485 490 495

Gly Glu Leu Tyr Val Leu Asp Arg Arg Thr Gly Glu Pro Leu Val Gly
500 505 510

Val Glu Glu Arg Ala Val Pro Gly Gly Gly Val Glu Pro Gln Met Arg
515 520 525

Tyr Lys Thr Gln Pro Phe Ser Leu Tyr His Thr Leu Arg Lys Pro Asp
530 535 540

Leu Thr Glu Arg Asp Met Trp Gly Met Thr Pro Ile Asp Gln Leu Val
545 550 555 560

Cys Arg Ile Gln Phe Arg Lys Ala Ser Tyr Lys Gly Ile Tyr Thr Pro
565 570 575

Pro Glu Ala Asp Arg His Ser Ile Glu Tyr Pro Gly Tyr Asn Gly Gly
580 585 590

Ser Asp Trp Gly Ser Val Ala Val Asp Pro His Arg Gly Val Ile Val
595 600 605

Ala Asn Tyr Asn Asp Met Pro Asn Tyr Asn Ile Leu Val Pro Arg Ala
610 615 620

Lys Ala Asp Lys Leu Gly Trp Ala Pro Arg Asp Gln Val Arg Gly Asp
625 630 635 640

Ala Gly Gly Ala Glu Gly Ala Gly Asp Pro Gln Ala Gly Thr Pro Tyr
645 650 655

Ala Val Asn Val Asn Ala Gly Trp Arg Leu Pro Phe Thr Lys Leu Leu
660 665 670

Cys Lys Gln Pro Pro Tyr Gly Gly Ile Arg Ala Ile Asp Leu Lys Ser
675 680 685

Gly Lys Thr Leu Trp Asp Arg Pro Phe Gly Ser Ala Arg Gly Asn Gly
690 695 700

Pro Phe Gly Ile Arg Ser Gly Leu Pro Ile Glu Ile Gly Thr Pro Asn
705 710 715 720

Asn Gly Gly Ser Val Val Thr Ala Gly Gly Leu Ile Phe Ile Ala Ala
725 730 735

Ala Thr Asp Asp Leu Ile Arg Ala Ile Asp Leu Ala Thr Gly Lys Glu
740 745 750

Leu Trp His Ala Lys Leu Pro Ala Gly Gly Gln Ala Asn Pro Met Val
        755   760   765

Tyr Ala Tyr Gly Gly Arg Glu Tyr Leu Val Ile Met Ala Ala Gly His
    770   775   780

His Phe Met Glu Thr Pro Ala Gly Asp Ala Leu Val Ala Tyr Ala Leu
785   790   795   800

Pro Gln Arg